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Translation

SOVIET SCIENCE AND TECHNOLOGY POLICY

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This non-serial report contains selected translations of Russian articles on the planning and administration of Soviet research and development and the introduction of scientific achievements into industry.

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OBSTACLES TO PUBLICATION OF SCIENTIFIC ARTICLES SCORED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Apr 80 p 2

[Interview with Professor V. Nalimov of Moscow State University by V. Zubkov: "Science: We Discuss a Problem: Obstacle? Brake? Accelerator?"]

> [Text] In science there are paradoxes, and contradictions move science. Scientific life is not possible without the struggle of ideas and without heated arguments. But there cannot be restrictions on science if its chief moving force is open research! Our special correspondent V. Zubkov talked about this with V. Nalimov, doctor of technical sciences and professor at Moscow State University.

Scientist: I fear that we could not manage without certain restrictions on science. If only because an error, as in no other field of human activity, from time to time threatens far-reaching consequences. An error which, for various reasons, may be taken for the truth.

True, these restrictions clearly can be seen as having a two-sided nature. On the one hand, restrictions play a positive role, permitting the concentration of scientists' efforts on clearly set directions, cleansing the channels of scientific intercourse from any nonsense that diverts attention. But, on the other hand, they display a braking influence on science. We have come at the present time to that boundary where a qualitative change is impossible without the investment of colossal efforts and material resources. That is, when the development of science reaches saturation, a large role is acquired by bold, at times fantastic ideas, which alone can provide new qualitative leaps in knowledge.

One does not have to go far for examples: we are much indebted to the mobilization of forces in clearly set directions for the outstanding successes in the field of nuclear physics and its technical applications, in the creation of lasers, and in cosmic undertakings that astonished the world. But, on the other hand, one can remember how genetics and cybernetics forced their way with difficulty.

Correspondent: One can also remember concrete events. When an associate of the Pulkovo observatory, Professor N. Kozyrev, first expressed his thought on the possibility of volcanic activity on the moon, opponents of the hypothesis unleashed a full-scaled campaign against it. But later, his work received affirmation and recognition throughout the world. What did science gain and what did it lose?

Scientist: I would like to refer to another example. About twenty years ago an article on applied mathematics was published. A little later in a serious journal appeared almost a stenographic transcript of a discussion of this work. Important scientists took part in this discussion. Almost all of the statements were negative, sometimes openly hostile. But the article still attracted attention. And after only a few years, serious work appeared which affirmed the correctness on both a purely theoretical and on a practical plane, and even more, the high effectiveness of the methods described in the article.

Let us try to analyze this example further. The author threw down the gauntlet to existing notions in science without, strictly speaking, sufficient basis for it. Criticism of the author's position was correct: Who could foresee that a new foundation would be found for the idea that then contradicted all existing concepts? One should not fail to note the boldness of the journal editors who decided to publish this work. But from this, of course, it does not follow that every work which throws down the gauntlet to established norms will be fruitful in the future.

In order to understand better such processes, it is necessary to examine the mechanism of restrictions in action. Among some scientists, the restrictive framework has a soft character, and they tolerate the right of extreme opinions to exist. Among others, the framework is very rigid. Such scientists suppose that they stand guard over "truth," although they themselves are often incapable of creative activity. When an idea new in principle appears in scientific circles and the "rigid ones" do not accept it, this is understood. But the trouble is that at times they attract some of the "soft ones" to their side. As a result, a new idea may never come to light.

Correspondent: It would be possible, perhaps, to publish it as speculation, as food for thought. But, as is known, it is not possible for a work to be published in this country without preliminary review. The Institute of Review, apparently, is the ultimate guarding instrument in science. But does it not seem to you that at times it becomes a net with small mesh that keeps back the bold ideas? In this connection, voices have been raised many times in favor of a change in the reviewing process.

Scientist: A review system operates not only in our country but all over the world. Review is needed to protect science from gibberish, although, like a dialectic, it is somewhat of a brake on the dissemination of ideas. But the review process cannot be changed without the threat that a flow of absurd publications overwhelm the channels of scientific communication. As deputy chairman of the editorial council of the mathematical methodology section of the journal ZAVODSKAYA LABORATORIYA, I often have the opportunity to come in contact with questions on the review process. About half of the articles we "wad up" because of their low level, and up to thirty percent we forward for revision. As you see, there is a significant amount of chaff.

And still the review process, from which innovative developments suffer at times, is not a perfect shield against balderdash. Here is an example from one journal:

> "...zero year to May--3113. Devil's sign--13, Christ--of Christ--three--one hundred--3100, and the "hole"--in number, 13 · 5 = 65, which leads to the length of the year 360-1/2 = 365 · 13/60 = 365.25 twenty-four-hour periods and to the possible quantization 55 days in the year."

How could such rubbish appear in an academic journal? It was read by an academician (it was he who submitted it for printing), by the editorial board, and was worked over by an editor... And on the cover appears a notice that it publishes short reports on newly completed and still unpublished research in the field of mathematics, natural science, and engineering of priority character...

Correspondent: Here the review process did not interfere with the publication of, as you say, balderdash. But if it had not been submitted for printing by an academician, it would not have been published. And not only this work, but also many others which were serious. Unfortunately, if a scientist is without an important name, he always has a problem: how does he acquaint his colleagues quickly with an original idea? Of course, we have conferences and symposia, and a great number of journals are published. But the queue to publish in them is considerable. And, besides, they nevertheless disseminate as a rule, proven ideas...

Scientist: But the process of scientific communication does not stand still. Take preprints. In the form of preprints, manuscripts are published without editing, without any form of review and are circulated to interested persons and organizations. Any associate of a scientific collective can publish a preprint using a rotaprint. Abroad, in many organizations, preprints are put out no more than a week after the manuscript appears. They create a certain kind of continuous seminar.

We have a preprint system in this country. But the attitude toward it, to put it mildly, is guarded, and only scientists who work in academy institutes can use it. Moreover, the number of rotaprint publications for some reason is now strictly limited.

Earlier, when there were less restrictions on the right to issue preprints, my colleagues published voluminous materials which much later came to light in book form. There was a lot of sense in this. The reader did not wait--he could become acquainted with material still not finally completed or still not fully verified and, what is very important, with materials for which the best form sometimes had not yet been found. The small circle of preprint readers helped the authors improve the content of their future scientific articles. On the one hand, preprints are a way to inform quickly a small circle of readers and, on the other hand, they are a way to refine the material for full-fledged publication. The preprint is our working material.

Correspondent: But the restrictions on preprints are also tied to a form of review: some works are published and others are not. Meanwhile, one can remember some events when an earlier repudiated work later received large response. But articles that were accepted smoothly and quickly and received positive review at times remained unnoticed.

Scientist: There is a paradox, if you will, in the review process. If the serious author knows that his work receives very favorable review, he then has doubts: did they like his work because he discovered nothing new and restated what was long ago discovered...by the reviewers? Unfortunately, this sometimes happens.

Correspondent: In our practice, as is known, anonymous review is also applied. Of course, on the one hand, this guarantees freedom for the reviewer to express his views and protects him from the influence of a big-name author. But, on the other hand, criticism on the quiet already smacks of anonymous letters and creates the possibility for irresponsible behavior on the part of the reviewer.

Scientist: Evidently, diverse forms and publication channels are meant for readers of differing categories and, accordingly, respond to differing demands. In any event, a system must evolve where a scientist has the opportunity to publish his works even when they are not proven and contradict what is generally accepted. A scientific hypothesis at the moment of its origin is, to a certain degree, imagination. And even if it turns out to be short-lived, this does not mean that it is useless. Its sense and value are that its consideration sharpens the situation and awakens scientists to new ways of thinking.

Science exists so long as problems become sharp and uncompromising. Sharpening a problem reveals the material in a new light. And, it is to be hoped, each real scientist experiences satisfaction if his hypothesis, even if rejected, spurs the development of a new direction in thought.

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L'VOV'S SCIENTIFIC CENTER PROVIDES REGIONAL COORDINATION OF R&D CYCLE

Moscow PRAVDA in Russian 17 Jun 80 p 3

[Article by A. Vasilets and A. Pokrovskiy, special PRAVDA correspondents, L'vov: "Region and Branch: Effectiveness of Science"]

> [Text] But really, why should science be divided into academic, administrative, and higher-school branches? This question is now being asked by the L'vovians for a number of reasons. One of them is the establishment of the Western Center of the Ukrainian SSR Academy of Sciences in this region. This means that the substantial industrial potential of this part of the republic, which includes enterprises of the instrumentmaking, machine-building, geological-geographic, and agricultural types, has been complemented with substantial R&D potential.

The first notable experiment in combining the resources of scientists and production men has succeeded--the L'vov combined production quality control system has won broad recognition throughout the country. But at the same time, this experiment revealed certain lacunae in the solution of complex scientific and technical problems requiring the joint effort of specialists under differing administrative jurisdiction. In effect, the [West Ukrainian] region, which consists of the Volynskaya, Zakarpatskaya, Ivano-Frankovskaya, L'vovskaya, Ternopol'skaya, and Chernovitskaya oblasts, contains 25 higher schools, some 30 branch scientific research institutions, and 18 academic establishments. These employ 12,000 people. This is an impressive resource. But it is extremely unevenly distributed: 85 percent of experts with science degrees and titles work in higher schools; 10 percent, in academic establishments; and only about 5 percent in the branch scientific research institutes. All this requires considering how to best develop in this sector of activity "a reasonable combination of the branch-of-industry and territorial [regional] principles," whose necessity was pointed out by Comrade L. I. Brezhnev.

The unifying link here has logically become the comprehensive plans for the development of scientific research and promotion of scientific and technical progress. The Western Scientific Center of the Ukrainian SSR Academy of Sciences and the councils of rectors of the L'vov and Chernovtsy higher-school zones have broken down these plans into several groups. The first group contains basic research problems of an interdisciplinary nature that are of major importance to the region's economy. These include the development of scientific principles of quality control as well as of automation principles, the restoration and enhancement of the protective functions of the ecosystems of the Carpathians and adjoining regions, and improvements in the efficiency of prospecting for and extraction of mineral resources.

The second group of topics pertains to the developmenta needs of the leading branches of the region's economy. During the current Five-Year Plan period 15 such programs have been isolated. This includes programs dealing with improvements in the quality of cathode-ray devices and automotive products and increasing the effectiveness of geophysical prospecting for gas and petroleum. This is how purposive interdepartmental research-and-production associations have been conceived.

The circulatory system of such a form of administration of scientific and technical progress has become the regular series of contracts concluded for a prolonged--3-to-5 years--period, along with joint laboratories and regular exchange of information. But in the economy, as in any other healthy organism, circulation is difficult to limit to any single organ--in this case, administration. The broad introduction of innovations at enterprises of the same kind and the conduct of a unified technological policy within the region urgently required transcending the framework of a single association. This has resulted in the development of four associations--instrument-making, machine-building, geological-geographic, and agricultural--representing interbranch research-and-production complexes that encompass the pertinent interdepartmental associations.

The Chairman of the Western Scientific Center of the Ukrainian SSR Academy of Sciences Y. A. S. Podstrigach declared: "Such a consistent and logical system has not, of course, arisen all at once and of itself. A tremendous role in combining the efforts of scientists and production men on voluntary basis has been played by party organizations and especially the L'vovskaya Oblast Committee of the Ukrainian CP. Even now the collegiums directing the complexes include representatives of the region's party branches. While combining efforts to solve the principal economic problems, we at the same time attempt to maximally coordinate the regional branch-of-industry interests and preserve the administrative and juridical autonomy of the organizations and enterprises belonging in a complex.

"What is it like in practice? Proposals submitted from the bottom up, as based on the local possibilities and resources, are considered by the collegium. The outlined plan of action is then approved by the appropriate ministries and the Presidium of the Ukrainian SSR Academy of Sciences, thus becoming mandatory for all participants. Please note that we have particularly well organized such voluntary cooperation with the ministries of medical industry, instrumentmaking, and means of automation and control systems."

Yaroslav Stepanovich continues: "What is the result? Consider just one example. Under the program 'Quality of Cathode-Ray Devices,' scientists at the Institute of Applied Problems of Mechanics and Mathematics computed the optimal pumping mode for black-and-white kinescopes. Since the project was carried out jointly with production men, the innovation was introduced within just one work shift. And the technological process time could thus be reduced by one-third, which enabled just one shop to achieve savings of 120,000 rubles annually. What is more, the innovation was introduced within the next six months in all principal enterprises of the branch. Altogether, this program produced an increase in real savings from 702,500 to 6,124,000 rubles within the first 4 years of the Five-Year Plan. At the same time, the yield per ruble of production cost has increased from 3.52 rubles in 1976 to 15 rubles in 1979."

Thus now the plant, as an equal member in the cooperation between science and production, can bypass its upper instances and report directly to its prime contractor--the collegium of the complex. And the collegium, in its turn, being familiar with the main directions of technological policies in the branches as well as with the research under way at the institutes, helps find a workable solution for the problems that arise.

This has happened in particular when the L'vov Synthetic Diamonds and Diamond Tools Plant found it necessary to reinforce a die used in diamond synthesis. The collegium of the machine-building complex posed a corresponding task to the scientists of the L'vov Polytechnical Institute. As a result, the problem was solved within a short period of time and new dies were introduced at the plant within three months. This produced savings of 200,000 rubles a year. But the entire branch was the gainer, since the innovation could be utilized at many enterprises of the Soyzalmazinstrument All-Union Diamond Tools Trust as well.

Even more productive was the research conducted by the Nedra Interdepartmental Association in methods of inductive heat treatment of high-strength heavy balanced drill pipe. The unique equipment and technology developed for this purpose served to reduce by 7 years the time of organizing the production of such pipe, to save 7.5 million in capital outlays, and to enhance pipe durability.

These examples are of the non-repeating kind. But even now the developmental prospects for the recently developed regional system for the management of scientific and technical progress are clear. Above all, conditions now exist for the formation of permanent teams of scientists and production men sharing a common goal, such that the completion of one project or another does not result in dissolution of the team. The collegium of the complex is duty-bound to exploit the available resources by switching them to new programs. This concerns, incidentally, substantial resources. One and one-half thousand scientists participate in the programs of the complexes and associations.

But there also arises the task of a maximally productive utilization of the available resources. Consider that the existing complexes operate chiefly in the area of L'vovskaya Oblast, and their links with the enterprises and scientific institutions of other centers in the region are weak. This affects not only the "geography" of the zone of action of the complexes but also the level of research projects. Emphasis on important yet particular projects prevents devoting sufficient attention to basic research. It is not accidental that the scientific establishments of the Western Center so far have not participated in even one Union or republic-wide interdisciplinary program.

The elimination of these gaps to some extent has been the purpose of the general meeting of the Center's council, which was attended by representatives of party organizations, research establishments, higher schools, and enterprises from all of the region's oblasts. That meeting will assist in broader propagation of the experience gained in L'vovskaya Oblast.

In his address at that meeting, the President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton pointed out that, now that the age of scientists or even institutes working in isolation has passed, priority is given to problems of teamwork between various scientific research establishments and industrial enterprises for the sake of solving major problems. The experience gained by the Western Center in developing interdisciplinary research programs and introducing their results into practice is highly valuable and promising. At present it is important to improve the quality of the work in that direction rather than pursue the development of an increasing number of new programs.

Thus, through their combined efforts, the scientists at higher schools, academic, and branch-of-industry institutes in this large region are consolidating their accomplishments and conducting an offensive along the entire front of scientific and technical progress.
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DIFFICULTIES IN ESTABLISHING SCIENTIFIC-PRODUCTION ASSOCIATIONS DISCUSSED

Moscow IZVESTIYA in Russian 1 Apr 80 p 2

[Article by N. Lidorenko, Corresponding Member of the USSR Academy of Sciences and Director of the All-Union Scientific-Research Institute of Current Sources: "To Improve the Economic Mechanism: Great Potential: Scientific-Production Associations Are the Optimum Form for Uniting Science and Production"]

[Text] The CPSU Central Committee provides systematic aid for the development of scientists' initiative and stimulates their creativity. The July (1978) Plenum of the CPSU Central Committee made concrete recommendations which make possible the strengthening of ties between science and production.

How are these recommendations being implemented? Well known are the forms for hastening the practical utilization of fundamental scientific achievements that are being developed with initiative in the USSR Academy of Sciences, in its Siberian Department, and in the Academies of Sciences of the Ukrainian SSR and other republics. The concern is with agreements at the ministry-academy level. Only the Siberian Department of the USSR Academy has more than ten such agreements. At the same time, ministerial institutes also bear direct responsibility for hastening the rate of industrial realization of the achievements of fundamental research. It is there that the great majority of scientific and engineering personnel are concentrated. What are the optimum forms for utilizing this great force for raising the effectiveness of production?

I will allow myself to introduce some examples from the activity of the All-Union Scientific-Research Institute of Current Sources (scientific management is carried out by the USSR Academy of Sciences).

The Institute specializes in research on designs for direct conversion of various types of energy into electricity. It has experimental plants and is the head organization for a recently formed scientific-production association.

Electrical technology traditionally utilizes the latest achievements of physics and the related sciences and adopts the results of scientific research in the field of electricity being conducted not only the USSR Academy of Sciences but also in many industrial institutes. It therefore belongs among those branches of knowledge and technology which are subject to continuous renewal and improvement. This branch of industry is developing at an extremely rapid rate in the world.

The further expansion of human knowledge about the electrical nature of matter, evidently, is as boundless as the unlimited possibilities for the development of their useful practical applications. This is illustrated by the numerous cases of revolutionary influences on electrical technology by the achievements of semiconductor technology. In particular, semiconductors have made an enormous contribution to improvements in information systems and in automation and computing equipment. They have permitted the reduction in the amount of materials used in these devices to tenths and hundredths of former amounts and have given these devices new qualities and industrial significance. The fields for utilization of these achievements are far from exhausted and are expanding continuously.

If one speaks of electrical power technology, it is still at an early stage of a future revolutionary jump. Thyristors--new devices for electrical power technology--have made a large contribution to lowering the amount of materials used for power transformer technology and for energy distribution equipment. Following the analogy with microelectronics, it is anticipated that in the near future there will be integrated circuits for power, an optimization of generating equipment, and the transformation of electrical energy!

The creation of scientific-production associations provides for the intensification of creative activity and makes it possible to hasten the utilization of scientific achievements in practice. The Ministry is renovating experimental production facilities and is building a new experimental plant. The composition of the association is reinforced with technological and design subunits. Its scientific-research base is being renovated or expanded.

Despite the fact that the association has existed only two years and has suffered through a formulative period, its volume of scientific-research and experimental-design work increased by 21 percent, and the volume of manufactured industrial products, by 10 percent. At the level of inventions, around 80 percent of the conservation-promoting subjects were implemented.

Basic types of the products of the association are neither inferior nor superior to the achievements of leading firms of capitalist countri

In recent years, certain massive types of current sources and equipment for their production either in the form of licenses or in the form of manufactured articles or equipment themselves have entered the world market both in socialist countries and in Western countries.

The actual economic effect achieved in various branches of the economy from the utilization of only part of the collective's scientific achievements exceeded 50 million rubles in 1979.

However, the possibilities for increasing the effectiveness of scientific research that have been opened up by the creation of the association are far from being exploited fully. A number of problems with the organizational plan, which are tied to the formation of the association, still remain to be solved. In particular, a gap is observed in the support of scientific potential with an experimental production base.

More than seventy percent of the capacity of experimental plants is devoted to serial production; there is a corresponding lag in innovation. Work pay and material incentive for scientific and production collectives still conform to different systems. Follow-through planning for the development and assimilation of new technology is cut off from material-technical support.

Our association is hampered by a three-ringed management structure. The All-union Industrial Association (VPO), to which we are subordinate, uses only up to five percent of the scientific potential of the collective; therefore, it is not interested in the development of the association. I will provide but one example. Our experimental plant in Moscow was permitted in 1968 to undertake renovation. However, the management of the All-union Industrial Association for ten years used the allocated means not for the development of science but for building ordinary facilities for the output of outdated technology. As a result, the renovation of the plant was not started until 1977. This caused the loss of tempo in introducing highly effective technology surpassing world levels.

The All-union Association illegally practices the assignment of tasks in the middle of the year. In a number of cases they turn out not to be feasible because of their lack of scientific development. In this instance, the planning does not carry khozraschet [self-supporting] financial responsibility.

Normal work is also hampered by withholding of approval of methodological instructions for the application of criteria for "stimulation" under the conditions of the scientific-production association. The methodological regulations on the formation of funds for economic stimulation at pilot (experimental) enterprises that have been approved by the USSR Gosplan, are very cumbersome and contain contradictory stipulations. The basic shortcoming of the regulations is that indicators are related only to the activity of the present enterprise and do not provide for encouragement to the introduction of new technology or new equipment which raise labor productivity at other plants in the same industry or in other industries.

Gosplan and the ministries fail to give sufficient attention to the creation and renovation of experimental shops and plants, where capital investment is extremely insignificant compared with the scale of investment in the construction of serial-production plants. Either they are excluded from the plans or they are put off from year to year. It should not be forgotten that in these small shops, tomorrow's engineering and technology are being created.

The actual experience of our collective confirms that scientific-production associations are the optimum form for uniting science and industry for the purpose of raising production effectiveness. The quickest solution of the organizational problems of the scientific-production associations will aid the hastening of tempo in introducing scientific results into practice.

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GEORGIAN OFFICIAL PROPOSES CHANGES IN STRUCTURE OF SCIENTIFIC-PRODUCTION ASSOCIATIONS

Moscow EKONOMICHESKAYA GAZETA in Russian No 7 1980 p 6

[Article by Otar Georgiyevich Gvakhariya, director, Tbilisi Elva Scientific-Production Association: "What Should the Scientific-Production Association Be?"]

> [Text] In this article Otar Georgiyevich Gvakhariya, director of the Tbilisi Elva Scientific-Production Association, shares his ideas and views on improving coordination in the "institute-experimental plant-series production" chain.
>
> O. G. Gvakhariya, upon graduating from the Tbilisi Polytechnic Institute imeni Lenin in 1949, was employed at enterprises of the electrical equipment and radio engineering industry as a designer, process engineer, shop superintendent, technical inspection division chief, chief engineer, and plant director. Since 1975 he has served as director of this scientific-production association.

Our Elva is a typical scientific-production association. Component elements include the Tbilisi Scientific Research Institute of Instrument Engineering and Automation Equipment, an experimental plant, and a control computer plant. The association has established a solid position in the nine years since its establishment. Minpribor [Ministry of Instrument Making, Automation Equipment and Control Systems] has specified the clear-cut specialization of this NPO [Scientific-Production Association] and the directions of its development.

Labor productivity in our NPO will have doubled in the course of the 10th Five-Year Plan. There has occurred a complete refurbishing of our product line. Control computer packages have replaced keyboard equipment. A number of new product items developed at our institute have been put into production. They include an information-computer package for controlling large state regional electric power stations and nuclear power stations, as well as other devices. Last year we began manufacturing a control computer package developed jointly with the Moscow Institute of Problems of Control.

Three Links of a Unified Chain

One of our main concerns is to ensure effective coordination among the structural units of the scientific-production association. The technological level of manufacture at the control computer plant is improving. In particular, the institute is developing for this plant local manufacturing process control subsystems, and automated design of series-manufactured assemblies and efficient methods of parts manufacture are being adopted. The main and auxiliary shops have been renovated in recent years. Much is being done to improve production worker labor conditions.

At the same time institute development projects are now moving more rapidly from the laboratory to the plant production line. This gratifying phenomenon is easily explained: project developers take active part in setting up production of new hardware.

The people at the institute remember the time when they were searching for plants where their research project results could be adopted. As a result the bulk of design documentation was being shelved and remaining unimplemented. The situation has now changed radically.

We have no grounds for complacency, however. In a number of indices we are still lagging behind the leading scientific-production associations of Minpribor. We are setting for ourselves the goal of catching up with them, more fully utilizing the advantages of this form of link between science and production, and of producing greater return on effort.

In recent years certain problems have cropped up, resolution of which is dictated by the necessity of further development of scientific-production complexes. The 12 July 1979 CPSU Central Committee and USSR Council of Ministers decree contains specific measures to speed up scientific and technological progress and expansion of the manufacture of new and efficient products. It stresses the importance of shifting over to an economic-accountability system of activities pertaining to design, development and adoption of new hardware, as well as focusing on good end results. Material incentive for NPO personnel is now being made dependent on aggregate economic effect actually obtained in the economy from utilization of scientific and technological advances. It is our duty to achieve the fastest possible return on expenditures connected with development and adoption of new products and manufacturing processes.

To what extent does the present structure of the scientific-production association correspond to these demands? This is an important question. Successful accomplishment of today's increased tasks is determined to a certain degree by the established interrelationships within the "institute-experimental plant-series production" chain.

In this regard my attention was drawn by an article published in issue No 32 of EKONOMICHESKAYA GAZETA, by Z. N. Polyakov, general director of the Leningrad Plastpolimer NPO, in which he shared his views on the role and place of series industrial production in the scientific-production association. Comrade Polyakov feels that series industrial production should fully correspond to the specialization of a scientific-production association. The scale of commercial production should be intelligently restricted to certain limits in order to ensure that engineer and technician personnel are less diverted from performance of their principal task -- development of new hardware.

Requiring Refinement

I am in full agreement with the first conclusion, for the organization of scientific-production associations pursued precisely the objective of uniting the efforts of scientists and production people on accomplishing concrete tasks. The activities of Elva are based precisely on this foundation. The institute's project results are implemented at a series-production plant which is totally engaged in the manufacture of products conforming to the specialization of the NPO. Consequently favorable conditions exist for focusing all efforts on the development and manufacture of products which define the association's character.

On the other hand, we cannot agree with the other suggestion -- that the scale of commercial production at an NPO be limited in order to avoid diverting personnel from work on developmnet of new products. Our primary task, as is stated in the Statute on the Scientific-Production Association, is not only to develop new hardware but also to put it into production. It is my opinion that both are equally important. Therefore the scale of production should be determined not by such a highly imprecise criterion as the degree of "diversion of engineer-technician personnel" but rather proceeding from the needs of the nation's economy as regards the products of an NPO.

In my opinion the broader the representation of the production component in an association, the more rapidly project results will go into series production. If a significant percentage of the scientific output of an NPO is designated for enterprises outside the association, this will lead to the situation which existed prior to the establishment of scientific-production complexes.

Therefore from our point of view it is desirable to add certain refinements to the Statute on the Scientific-Production Association, namely that an NPO may contain both experimental and series-manufacturing plants.

In those instances where the needs of the economy cannot be satisfied by NPO series-producing plants, subbranch enterprises (production associations) should be brought into product manufacture. But here the all-union industrial associations come into play, for this is their job.

Somebody might ask: "With the existing dimensions of series production, not to mention increasing its scale, are you not experiencing difficulties? Must not disproportionate attention be focused on commodity output?" Yes, difficulties do exist. I believe, however, that they are caused not so much by the scale of commodity output as by its organization.

The fact is that the "division of labor" established within an NPO does not always take into account the specific features of structural units.

I shall begin with the experimental plant. Logically it should be fully freed of purely production assignments. In practice there does not exist in the scientific-production associations in our branch of instrument engineering a clear-cut division of production facilities into experimental and series-manufacturing. Sometimes an enterprise which is a component of an association serves as an experimental facility and at the same time is engaged in series manufacture according to a ratified plan. Understandably it is not easy to combine the two.

But even in those instances where a plant has a firmly established status of an experimental facility, commodity output is also plan-targeted for it. Since according to present regulations the structural unit (in this instance the experimental plant) cannot include in its plan fulfillment report the production of goods and services for another structural unit -- the institute, an abnormal situation is created. The manufacture of experimental models of products, various devices, test bench setups and everything else necessary for accomplishment of scientific-technical projects proves to be an "unplan - targeted task" for the experimental plant.

As a result the interrelations between an institute and its experimental facility become more complex, for plant industrial-production personnel wages can be disbursed only to the measure of performance of plan-targeted tasks, but not for contractual work performed for a scientific research institute.

Also it is necessary to shift workers over to "scientific" as a temporary measure. As a result some workers at the experimental plant receive pay from plant funds and others from institute funds.

Who Should Direct a Scientific-Production Association?

Finally, we should discuss the established procedure of handing over association management to the management edifice of the principal structural unit, that is, the institute.

The component enterprises of an NPO are deprived of legal independence; the institute administration bears all responsibility, not only for scientific but also production activities as well. And yet the qualifications and experience of the administrators of the functional institute services are inadequate to handle the numerous problems of a current production nature.

On the other hand the Statute on the Socialist State Production Enterprise no longer applies to a plant engaged in series manufacture when it joins an NPO. The plant cannot obtain, for example, Gosbank credit for production stocks.

A fairly typical situation arises: leading specialists of the NPO functional services commence commanding, like line chiefs, while plant management, to justify its own mistakes and blunders, proceeds to put the blame on a lack of adequate powers and responsibilities. At the present time NPO managers are compelled to deal chiefly with matters connected with production, while they lack both time and manpower for large-scale scientific problems.

For this reason it is my opinion that in our concrete conditions the NPO should be run not by the institute administrative edifice but by an association management edifice established within the limits of the existing staff. It is also inadvisable that the NPO general director serve simultaneously as scientific research institute director.

It is important to free scientific research institute personnel from the performance of functions inappropriate to them.

Extensive experience has been amassed during the years scientific-production associations have been in existence. This experience and know-how should be studied and further developed from the standpoint of further improving the economic mechanism. The ideas and suggestions presented here should be discussed and debated. Other suggestions and proposals could also be made.

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BELORUSSIAN JOURNAL EXPLORES WAYS TO LINK SCIENCE WITH INDUSTRY

Minsk PROMYSHLENNOST' BELORUSSII in Russian No 11, 1979 pp 31-36

[Article by A. Pustokhod, sector chief, BelNIINTI, and G. Shapiro, senior scientist: "Shoulder to Shoulder: Forms of Innovative Cooperation Between Scientific Establishments and Industrial Enterprises"]

> [Text] The alliance between science and industry is producing tangible results. For example, savings achieved from incorporation of scientific research project results in our republic's economy totaled 158.5 million rubles last year alone. The volume of economic contract work performed that same year by scientific establishments of the Belorussian SSR Academy of Sciences and higher educational institutions exceeded 46 million rubles (3 million rubles 10 years ago).
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> Following the Communist Party of Belorussia Central Committee and Belorussian SSR Council of Ministers decrees entitled "On Measures to Achieve Further Development of Science and Strengthening of Its Link With Production" and "On Measures to Achieve Further Improvement of Planning of Scientific Research Work and Accelerated Incorporation of Research Results in Production," all scientific establishments revised their plans, eliminated research topics of minor significance, and brought problems of scientific search closer to the urgent needs of this republic's economy. All this also had a positive effect on improving effectiveness of development of science proper.

Systems Approach

A systems approach to planning scientific and technical advance has significantly fostered further strengthening of interaction between science and production and a higher level and significance of scientific research. In the past initiative in this area came primarily from the scientific researcher, as a result of which an excessive number of research topics which did not lend themselves readily to elaboration were concentrated in planning agencies, while with the present planning system a decisive role is played by government agencies and enterprises. They submit their program requests to Belorussian SSR Gosplan; in addition to research topic, these program-requests also specify the immediate executing entities. This approach enables Belorussian SSR Gosplan, jointly with the Academy of Sciences higher educational institutions and republic branch scientific research institutes, to concentrate scientific manpower and resources on those research areas which are the most promising and important for the economy, to coordinate research topics, to determine acceptable timetables and specific executing organizations, and on this basis to draw up a long-range plan.

The practice of drawing up a program of utilization in production of completed scientific-technical projects of considerable economic significance constituted an important step toward accelerating the adoption of research results in production. After they are coordinated with the appropriate scientific subdivisions and enterprises, they are ratified by Belorussian SSR Gosplan and become a directive document. Thus Gosplan was able not only to put into the national economic plan research topics which are promising from the standpoint of further development of science, technology and production, but also to make decisions to terminate those projects which have lost their significance or are being carried out on an inadequately high scientific-technological level, as well as making required changes in plan targets.

Also producing a positive effect was planning of scientific research projects on the basis of the specific-program method, specific-purpose financing of science and technology programs, and planning of economic effect from utilization of scientific research results in the economy.

The new approach means successful completion of many current-importance research topics. For example, last year scientists of the Belorussian SSR Academy of Sciences completed basic research on 68 topics and projects specified by 270 economic contracts. A total of 187 project results were incorporated in the economy, with total savings of 53.2 million rubles. That same year Belorussian SSR Academy of Sciences personnel received 926 affirmative decisions on issuance of certificates of invention.

Much has also been accomplished by scientists at higher educational institutions. The volume of research performed by these scientists has increased by almost one third in the last 2 years.

Thus planning of scientific research has become one of the principal directions taken in strengthening the relationship between science and industry. Experience has confirmed the correctness of this.

New Forms

Until recently, branch scientific research institutes were submitting their research results to design organizations, after which engineering organizations would become involved, followed by industrial enterprises.

Since all of these are independent and administratively separate, as a rule delays are inevitable at each interorganization point of juncture. In addition, as we know, the process of development of new equipment, for example, goes through a number of stages from the moment an idea is conceived to its practical embodiment. In other words it possesses a specific structure, which comprises a quite extensive organizational system -- an aggregate of organizations performing scientific research work of a basic and applied nature, design development, fabrication of experimental models, their testing and refinement, production startup preliminaries and direct participation in putting new equipment into production.

Also proceeding from the diversity of stages of development of new equipment are corresponding organizational forms of management of scientific and technological advance, the operation of which is directed toward ensuring unity of all elements of the controlled system. Efficient performance of this complex task is possible only if all stages of the "research-production" process are combined into a unified whole, with corresponding organizational and economic conditions. With this existing organization of management of scientific and technological advance, however, when the stages of scientific research and experimental design development projects in many branches of industry are organizationally disconnected in time, it is very difficult to achieve this. The coordination problems which as a rule arise in the process of development of and production startup on new equipment, with transfer of project results from one executing entity to another, evoke numerous efforts at coordination and agreement, engender compromises, etc. This has a negative effect on quality of work performed and extends timetables.

Analysis of the timetable of design, development of and production startup on new equipment in branch ministries indicates that these timetables cannot be considered satisfactory. On the average they stretch out from 3 to 7 years. Due to bugs in design and manufacturing process, only 30-50% of product development projects are utilized in industry. The time required to start up series production on new equipment products frequently drags out to 3 to 5 years, which leads to premature obsolescence of the new equipment and to rapid retirement from production. Some machinery models, development of which ran on for several years, remain for only a year or two in series production. Obviously, the expenditures involved in putting these new items into production are not recovered.

The increasing complexity of the "science-engineering-production" system leads to more intensive dismemberment of the unified process of design and development of new equipment and to the increasing involvement of subcontracting organizations in this process. It is understandable that under these conditions a shortening of the time required to develop new equipment products depends to a considerable degree on skilled, efficient resolution of problems which arise at the juncture of the separate stages of scientific-technological advance and on time- and goal-coordinated activities by research scientists, process engineers, designers, and production people. And in the final analysis it is dependent on the employed organizational-economic forms of link between science and production, ensuring that new equipment takes the shortest path to the end consumer.

In recent years new organizational forms have appeared, alongside the traditional forms of relationship between science and production (economic contracts, productive collaboration agreements, etc): scientific-production, production, and technical associations, scientific-technical centers, specialized production adoption organizations, training-scientific-production associations, etc. One example is the scientific-production association, established as a result of merging branch scientific research organizations with industrial enterprises. These associations possess the requisite conditions for efficient organizational forms of link between branch science and production, ensuring accomplishment of all stages in the process of developing and starting up production on new equipment products, optimal joining of these stages, as well as unity of executing entities responsible for the quality, timetable and effectiveness both of the entire project program and its individual parts.

Let us take a closer look at the old and new forms of link between science and production, at their strong points and drawbacks.

Associations

At the present time there are 150 production associations (PO) in this republic. Unfortunately many of these do not utilize the obvious advantages of large production-economic complexes. For example, only 20 of them have scientific research and design organizations. This is due in the first place to the fact that many of these associations are unwarrantedly small both in number of employees and in volume of production. Secondly, not all PO have accomplished the requisite job of centralizing management functions, including those of scientific-technical and design subdivisions, as well as establishment of large scientific-technical subdivisions based on them (as has been done, for example, in the Integral Association).

Five scientific-production associations (NPO) are operating in the area of instrument engineering, road equipment machine building, woodworking, and agriculture. Their establishment was dictated by the tasks of concentrating scientific manpower resources in the most important areas of scientific and technological advance, by changeover to the new system of planning and economic incentive, by the territorial integrity of scientific research institutes and the industrial enterprises connected to them.

Since their establishment, NPO have achieved certain economic and scientific-technical results: the time required to complete and implement scientific research projects has been shortened, economic effect from utilization of products developed and put into production by the associations has increased, there has been an increase in the percentage share of new products in total output volume, and the quality of manufactured products has improved. But there also exist serious shortcomings in the performance of NPO. Take Dormash, for example. This NPO does not directly perform scientific research activities, but incorporates the results of research projects performed by institutes on the basis of economic contracts. It is understandable that without its own research facilities it is difficult for Dormash to elaborate the fundamentals of a scientific-technical policy in the branch, although precisely this constitutes the association's principal task.

Practical experience indicates that NPO should have at their disposal adequate facilities to conduct experimental work, develop experimental models, turn out initial batches of experimental models, and produce new product items in small series. (This, incidentally, should be the extent of the production function of NPO; they should not be burdened with plan-specified targets calling for the manufacture of large series).

It is also advisable to authorize NPO to determine for themselves series production volume of the designated product specialization for the plan-covered year, which eliminates equipment down time and will ensure obtaining a portion of profit not to the detriment of performance of the principal tasks of developing new equipment products.

There is another problem: there is a lack of complete coordination of matters pertaining to planning, financing and economic incentive for development of production startup on new equipment products. And how can everything be coordinated if the question of uniform indices of planning and evaluation of NPO activities has not yet been resolved? Plan indices for science and production (special design offices and experimental production) are assigned separately. The absence of a comprehensive plan makes it impossible for NPO to provide complete and comprehensive financing of all stages of the "research-production" cycle. Frequently the economic incentive fund is also separately (for plant and experimental production facility) formed and distributed. A unified NPO material incentive fund does not exist, and therefore material incentive for special design office teams and experimental production facility personnel is provided separately and in differing percentages of payroll fund. There is also a lack of a uniform system of wages for special design office and experimental production facility personnel: the former are paid on the basis of one system, and the latter -- according to another. And yet with establishment of the association these structural units began bearing common economic responsibility for the entire aggregate of work performed, from preparation of technical documents to manufacture of the initial series of experimental models of new machinery. Therefore it is advisable to determine wage groups taking into account the operations of the entire complex, not of its individual subdivisions.

In addition, excessive overloading of the experimental production facility of an NPO with series manufacture of machinery leads to a situation where the current experimental projects list plan is not fully executed. Focusing an association on current production activities results in a sharp lag by experimental facilities behind the scientific and technological level of scientific research projects being conducted by the association. The adoption of machinery which has been insufficiently refined and tested drags out the production startup process by several years. As a consequence of this, the labor requirements and production cost of a new machinery item often greatly exceed design indices.

It is quite obvious that it is the duty of this republic's ministries and agencies to continue working on further development of existing PO, NPO, and technical associations simultaneously with establishment of new ones.

Scientific-Technical Centers

The scientific-research organizations of associations are unable to exert effective influence on technological services, which remain under the control of the enterprises. Therefore making the technological services direct components of plant scientific research institutes and design offices is an extremely promising and effective means of improving the situation (such a merging of services took place, for example, in the Minsk Tractor Building Association).

There is lacking in a number of associations, however, a concrete, efficient link between research laboratories, which has a negative effect on their performance of the entire complex of scientific-technical projects. Therefore the need has arisen to change the structure of laboratories and offices, to establish on their basis qualitatively new subdivisions subordinate to unified management. The scientific or scientific-technical center, which is responsible both for the technical and technological level of production, is becoming such a subdivision.

A large scientific center has been established, for example, in the Minsk Tractor Building Association. It is organized on the base of plant physical metallurgy, ultrasonics, metal pressure shaping, welding and casting laboratories. It also includes an information-computer center and a technical information division. The scientific center of the principal enterprise of the BelavtoMAZ Association includes five design-engineering subdivisions, two experimental shops, and 12 scientific-research laboratories, employing 1,700 persons (526 of whom conduct scientific research). Approximately 300 persons are employed at the scientific-technical center of the Grodno Azot PO. The scientific-research laboratories, the activities of which are coordinated, are equipped with good facilities. In essence a small scientific-research institute is operating in the association.

The establishment of scientific-technical centers has promoted strengthening of the link with major scientific establishments. The results are in evidence: each year 20-30 economic contracts are entered into, each and every ruble spent on this generates more than 9 rubles savings, and the time required for implementation of scientific research results has been greatly shortened (often it takes only 6 months from initial idea to its implementation).

In our opinion further scientific-technical advance in this branch can be achieved by establishment of branch scientific-technical centers. Their role can be performed by combined scientific-research institutes, at which scientific research, design and engineering projects and experimental production are concentrated, as well as scientific-production associations, which include scientific research institutes with design and industrial enterprises.

Economic Contracts, Comprehensive Plans

Economic contract jobs and jobs performed on the basis of development collaboration agreements play an important role in our republic. The Belorussian SSR Academy of Sciences, for example, is involved in a volume of economic contract work comprisingalmost half of total scientific research financing.

Development collaboration agreements have also become widespread. The Belorussian SSR Academy of Sciences and the Belaruskaliy PO offer a persuasive example in this regard. Integration of science with production has led to the adoption of a promising separate method of potassium production. Work "under one roof" by scientists from the Belorussian SSR Academy of Sciences Institute of General and Inorganic Chemistry and the potassium workers of Soligorsk has also been marked by another success: the people at the institute have developed, in place of costly addition agents for ore beneficiation, less expensive reagents from chemical plant waste products (savings -- 5 million rubles). The Physical-Technical Institute, working in collaboration with the Minsk Automotive Plant, has developed and put into production an advanced process for final dimensioning and hardening machine parts. Savings have exceeded 3 million rubles.

There are many examples. In the current five-year plan alone institutes of the Belorussian ASSR Academy of Sciences are participating in 31 major nationwide economic programs, 20 comprehensive republic programs on major scientific-technical and socioeconomic problems, and eight republic programs connected with incorporating scientific and technological advances into production.

There is one more progressive form -- drawing up of comprehensive plans of joint efforts by establishments of the Belorussian SSR Academy of Sciences and the republic's largest enterprises. The institutes of the Department of Physical-Technical Sciences are working with the Minsk Automotive Plant and Gomel' industrial enterprises according to such plans, as are institutes of the departments of physical-mathematical sciences and physical-technical sciences with electronic computer enterprises. Eleven institutes of the Belorussian SSR Academy of Sciences, higher educational institutions and branch institutes of various ministries and agencies are participating in joint projects with the Beloruskaliy PO.

There has also developed in recent years such an effective form of linking science with production as joint work by the Belorussian SSR Academy of Sciences and individual ministries on joint comprehensive plans. They specify the conduct of scientific research and experimental design projects, as well as incorporation of project results at the plant level. For example, a ministry branch institute, seven institutes of the Belorussian SSR Academy of Sciences and an equal number of building materials enterprises are taking part in projects with the Belorussian SSR Ministry of Construction Materials Industry.

Strengthening of the link between science and production and expansion of the influence of academic institutes on acceleration of scientific and technological advance is promoted by the widely-practiced organization in the Belorussian SSR Academy of Sciences of branch laboratories and groups, which are established within academy institutes. Their work is financed by the appropriate ministries. At the present time such subdivisions are operating at the institutes of applied cybernetics, mechanics of metal-polymer systems, problems of machinery reliability and durability, nuclear power engineering, and peat.

This republic's higher educational institutions are also actively participating in the conduct of scientific research and incorporation of research results into production. One of the most widespread forms of relationship between higher educational institutions and industrial enterprises, academy and branch scientific research institutes is drawing up of economic contracts and development collaboration agreements. Presently more than 80% of all projects being performed by higher educational institutions are being carried out on the basis of economic contracts on direct orders placed by enterprises.

Scientific research performed by this republic's higher educational institutions on the basis of development collaboration agreements has also experienced development. MRTI [Minsk Radio Engineering Institute], for example, worked on the basis of nine agreements with the academies of sciences of Belorussia, Lithuania and Latvia, and Gomel' State University -- with the Belorussian SSR Academy of Sciences on the basis of 10 agreements. The Novopolotsk Polytechnic Institute resolved a number of problems of a regional nature on the basis of collaboration agreements with the Belorussian SSR Academy of Sciences and industrial enterprises.

Unfortunately further improvement in the effectiveness of higher educational institution scientific effort and strengthening of its links with production, academy and branch scientific research institutes is being impeded by its organizational isolation. Higher educational institutions are still poorly linked with branch ministries.

Correction of these and other deficiencies would be assisted by coordinated, well-organized work between higher educational institutions, research organizations of the Belorussian SSR Academy of Sciences and branch scientific establishments, as well as the establishment of general higher educational institution experimental laboratories, instrumentation rental offices, and computer centers.

Training-Scientific-Production Associations

Belorussia was the first in the country to adopt such a promising form of coordinated efforts by scientists and industrial workers as training-scientific-production associations (UNPO). Their goal and principal task is improvement in efficiency of performance of scientific research, a shorter time frame for incorporation of project results into production, and coordination of the efforts of scientific research institutes, design organizations and higher educational institutions in performing combined scientific-technical tasks.

Twenty such associations are operating in this republic. The greatest success has been achieved by the "Belorussian Polytechnic Institute-Minsk Automotive Plant," "Belorussian Polytechnic Institute-Minsk Tractor Plant imeni V. I. Lenin," and the "Minsk Radio Engineering Institute-Gorizont Production Association" UNPO. For example, since establishment of the "Belorussian Polytechnic Institute-Minsk Automotive Plant" UNPO there has been an improvement in scientific research project topics, an increase in the number of joint projects, and nine rubles profit has been generated per ruble of expenditures.

Establishment of UNPO has raised the long-term relations between higher educational institutions and industrial enterprises to a qualitatively new level. Close interaction between scientists and production people has made it possible more fully to utilize the scientific potential of educational institutions and to boost the effectiveness of the activities of higher educational institution scientists. The associations examine in detail scientific research topics and address the question of research topic combining and logistical support. It is precisely here that the requisite conditions exist for building experimental models and testing designs in enterprise experimental shops. On the other hand the associations appreciably help improve the quality of training of young specialists. Specializing departments are established, for example, directly at large enterprises. Such organization of the training process is directly linked to the incorporation of new research project results.

UNPO cannot, however, encompass all problems pertaining to the relationship between science and production. Hundreds of manufacturing processes and a large quantity of diversified equipment and materials are employed at every enterprise. It is of course impossible to establish a scientific center which would help precisely a given enterprise solve all its problems.

Therefore the Minsk Automotive Plant or Minsk Tractor Plant, in addition to contacts with the Belorussian Polytechnic Institute, must maintain extremely broad contacts with a large number of this country's scientific research establishments. Unquestionably such contacts are highly necessary. But there is also a negative aspect. Representatives of plant, higher educational institution, academy and branch science are encountered in the same enterprise shop. And all are working on the same problem....

In our opinion it is necessary to delimit the obligations of the various scientific establishments. For example, higher educational institution scientists are working today on a great many problems. It would be more expedient to concentrate their efforts on resolving interbranch or intersectorial problems, which are presently being devoted inadequate attention, to put it mildly. Reorientation of higher educational institutions would significantly facilitate the transition to specific-program planning, which science needs so badly today. Incidentally, scientific centers are complexes the purpose of which is to work on intersectorial problems of transportation, power engineering, and construction have already been set up at the Belorussian Polytechnic Institute.

It would also be advisable to examine the question of establishment of a unified higher educational institution scientific center in this republic. It could be assigned planning, supply, financing and organizational functions.

On a Volunteer Basis

Strengthening of the link between science and production is promoted by the widely-practiced organization of volunteer scientific subdivisions (divisions, scientific-production associations).

At the suggestion of the Minsk automotive workers, a volunteer academic division of truck problem research (OGrA) has been set up in the BelavtoMAZ Association. Its main area of activity is elaboration and execution of a scientific-technical program for establishment of a standardized motor transport system of large-capacity and very large-capacity trucks.

A joint meeting of representatives of the Belorussian SSR Academy of Sciences and the BelavtoMAZ Association was held in June of this year, at which the organizational formalities were performed for volunteer establishment of the "Institutes of Technical and Physics-Mathematics Specialization of the Belorussian SSR Academy of Sciences-BelavtoMAZ Association Enterprises" or "Avtofiztekh" Scientific-Production Association. The basic working areas of the Avtofiztekh Association were defined, and its scientific-technical coordination council as well as working groups were formed. A uniform coordinated plan was drawn up. Presently 41 scientific establishments are participating in carrying out a comprehensive program of establishment of a system of standardized high and very high capacity motor transport vehicles, a program designed to run 8 years. According to preliminary calculations, accomplishment of this program will provide the economy with average annual savings exceeding 1 billion rubles, with a total project cost of 53.5 million rubles.

We have discussed the most efficient and advanced forms of relationship between science and production. Other modes of interaction between scientists and practical experts are also employed in this republic: scientific-production brigades, group conferences of scientists with leading production experts, participation by scientists in the activities of enterprise technical councils, scientific direction of plant base laboratories on a volunteer basis, and establishment at enterprises of permanent mixed commissions for experimental-industrial verification and adoption of scientific project results.

A considerable amount still remains to be done, however, to improve the link between science and production.
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NEW APPROACH TO PLANNING AND ADMINISTERING R&D IN MOLDAVIA DESCRIBED

Kishinev SOVETSKAYA MOLDAVIYA in Russian 3 Apr 80 p 1

[Editorial: "Increasing the Output of Science"]

[Text] The prestige of Soviet science is great. It has a large role in transforming the life of the country. In solving the basic problems in the development of our society, the party invariably depends on science, consults science, and considers its recommendations.

"In the solution of the current tasks that face the economy, especially at the threshold of the next five-year plan," remarked Comrade L. I. Brezhnev, General Secretary of the CPSU Central Committee, at the November (1979) Plenum of the Central Committee of the party, "the party is counting on active aid from our scientists--from the USSR Academy of Sciences, from the republic and specialized academies, and from all scientific-research institutes.

"The tasks being placed before science, as never before, are massive and carry large responsibility. To solve them it is necessary to call all internal reserves to action to improve the planning, organization, and coordination of research and to exploit the accumulated potential for maximum output."

With respect to the republic, this potential is illustrated by the ever-increasing level of professional training of scientific personnel, by the presence of a modern research base, and by the breadth and depth of the scientific-research front. As was noted at a recent session of the annual meeting of the Moldavian Academy of Sciences, scientists of the republic in the last few years have accomplished research on a number of fundamental problems in the field of social sciences, mathematics, the physics and chemistry of semiconductors, and crystallography. Findings in the field of quantum chemistry and principles of genetics have been further developed. In the Academy of Sciences alone, the economic effect from the introduction of scientific developments into production during the first four years of the five-year plan was 65.7 million rubles.

At the same time, the output of science can and must be greater. Not only must the cycle be shortened for introducing new technology, but also management methods for science must be brought into agreement with the current level of development of production forces.

The ways to solve this basic task were formulated at the 25th CPSU Congress and a concrete program of action was laid out in the decree of the CPSU Central Committee and the USSR Council of Ministers, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality."

Today, when the scale of scientific-research work has become very broad and when production relationships have become very complicated, interdepartmental organizational forms and complete consideration of trends in the development of science and technology in all basic fields must be the basis for planning and managing science.

Such an approach has found expression in the program-goal method of planning and in the development and introduction into practice of interorganizational scientific-technical programs.

In the republic, as is known, there are now fifteen such programs; a Republic Council for Coordination of Interdepartmental Problems has been created and is functioning successfully. The programs, oriented toward the long term, comprise a wide circle of problems in the conservation and rational utilization of natural resources, in the increase in the role of intensive factors in the development of the economy, and, most of all, in the agrarian-industrial complex of the republic. Goal-programs thus make possible the systematic solution of the most important economic problems and they permit putting scientists' achievements into the service of production in a short time. The chief value of such programs is the orientation toward a final goal, toward concrete technical-economic results, and specific follow-through planning of time periods and steps in developments from ideas to their introduction into production.

Even the still limited experience convincingly demonstrates the advantages of the system that has been adopted. The organization of planning has been improved and, among the problems, duplication of effort and inconsequential research assignments have been successfully eliminated. Concentration of efforts has allowed the achievement in a short time of results that are valuable for practice. Scientists from the department of biological and chemical sciences of the Moldavian Academy of Sciences, for example, in cooperation with the scientific-production associations "Selektsiya," "Dnestr," and "Gibrid" have achieved important results in the fields of selection and in the use of biologically active substances and have developed principles for perfecting large-scale crop rotation and measures for intensifying feed production.

However, already at the first stage of work on the complex programs, some basic shortcomings have appeared. Collectives of a number of participating enterprises still are not imbued with responsibility for their role in collective scientific pursuits and, in a number of instances, departmental barriers interfere with genuine unification of efforts.

It is important party business to keep under scrutiny the realization of each stage of a complex program. Communists of head scientific institutions and of participating institutions, basic enterprises, ministries, and agencies, in whose interests the complex programs are being realized, must constantly work on questions of organizing cooperative activity, strengthening planning discipline, and perfecting each link of management in the scientific-research process.

Responsible tasks face industrial ministries and agencies that have scientific-research, design, planning-design, and technological institutions, and also experimental production facilities, which are faced with the transition to the cost accounting system in accordance with the decree of the CPSU Central Committee and the USSR Council of Ministers.

The effectiveness of this system is confirmed by the results of many years of experimentation in the electrotechnical industry. In the Kishinev Scientific Research Institute for Electrical Instrument Building, for example, as a result of transition to cost accounting, the planning of research work was significantly improved, the length of time for introducing new technology into production was cut in half, and economic indicators were higher.

At the same time, it is necessary to keep in mind that the reorganization connected with the transition to cost accounting is a complicated process which requires thorough preparation. Ministries and agencies that include scientific-research, design, planning-design, and technological institutions must carefully and thoroughly analyze their activity, study the results of introducing new techniques and technology into industry, and determine the resultant economic effect. Special attention must be given to the development of organizational-technical measures directed toward achieving a higher output from the introduction of completed developments, raising their quality, and shortening the period for creating and assimilating new technology.

Questions of the organization of the work of researchers and raising their professional qualifications should constantly be in the field of vision of managers of scientific-research, planning-design, and technological institutes and of the communists in these institutions.

The transition of scientific, design, and technological organizations to the cost accounting system assumes the creation within the ministries of a unified fund for the development of science and technology. This hastens the technical rearmament of the industry at the base with the achievements of contemporary science. It is a matter of purposefully utilizing these funds and boldly putting their stimulating effects into action. The perfection of control over science and the struggle for increasing its effectiveness are an important concern of party organizations, of scientific institutions, and of communists in ministries and agencies. They are called upon to carry out this responsible task actively, influencing at the same time the tempo of scientific-technical progress in the industry and the transformation into life of the economic program enunciated by the 25th CPSU Congress.

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SCIENCE ADMINISTRATION MUST BE IMPROVED

Yerevan PROMYSHLENNOST' ARMENII in Russian No 3, 1980 pp 60-61

[Article by A. Sadovskiy, deputy chief of the Science and Technology Administration of the Uzbek SSR Gosplan: "Science--A Productive Force"]

[Text] It is difficult to overrate the services of science in accelerating technological progress in manufacturing in Uzbekistan as reflected primarily in the rapid growth of the mechanization and automation of production processes. In two years of the Tenth Five-Year Plan period alone, the following were introduced into the national economy: 542 mechanized flow lines and comprehensively mechanized and semiautomatic lines; 287 comprehensively mechanized sections and 103 shops; 678 automatic integrated sets of machinery and installations; 84 automated lines and 12 shops. During the same period almost 1700 advanced technological processes were assimilated and about 600 new kinds of products were put in series production.

Every year the scientific establishments and VUZ of the republic transfer up to 200 completed developments to the national economy. Most of them are for the development of the cotton complex, accelerating technical progress in raising cotton and the cotton processing industry.

Developments completed by scientific establishments and VUZ find practical application in nonferrous metallurgy, machine building, food and light industry, land improvement and irrigation, in the gas, petroleum and petroleum refining industry and in a number of other industries in the republic.

At the same time, as indicated in the last plenums of the Central Committee of the CPSU and the speeches of Comrade L. I. Brezhnev, we have an untouched expanse of work on strengthening scientific production ties further and, especially their most vulnerable link--introducing completed developments into practice. In this case, special attention should be given to the necessity of improving the forms of organization, planning and management of science.

As is well known, in the last 10 to 15 years, forms that are new in principle have been originated and are being more widely disseminated in our country for organizing scientific research work. We have in mind scientific production associations [NPO] created in ministries to shorten the schedules of all stages of a single cycle: research--experimental production check--series production.

The "Uzglavgidrogeologiya," created in 1976, was one of the first such associations in our republic. The experience of this association is convincing confirmation of the high efficiency of this form of organizing scientific research. Such a synthetic indicator of the work of this NPO as repayment of expenditures for scientific developments speaks for itself--it is 8 rubles per each ruble spent.

The "Kibernetika" NPO created in the system of the Uzbek SSR Academy of Sciences is very promising. Its problem will be to accelerate the introduction of automatic control systems into the national economy of the country.

It is necessary, however, to admit that this progressive form of a tie between science and production is, so far, being disseminated in our republic very slowly. At present, only six NPOs are functioning in Uzbekistan. The scientific-technological complexes and industrial laboratories of the Ukrainian SSR Academy of Sciences which were organized for the first time in the Ukraine and approved by the Central Committee of the CPSU, have acquitted themselves well. These complexes, consisting of an academic scientific establishment, design bureau and an experimental production facility, accelerated considerably the introduction into production of scientific developments and increased their number of developments greatly.

It must be said that in our republic, such complexes already exist within the Academy of Sciences. These are the institutes of nuclear physics, physio-technical and electronics. These scientific establishments also have a design bureau and an experimental production facility. However, organizationally they are still not legalized as was done in the Ukraine.

The Republic Gosplan, jointly with the Uzbek SSR Academy of Sciences and interested ministries and departments, developed comprehensive programs for 11 key scientific-technical problems of regional importance. They were approved by the government of the republic and represent a plan directive document. In particular, one of these programs specifies the development, during the Tenth Five-Year Plan period, of measures to protect the fresh underground water resources of Uzbekistan from depletion and contamination.

According to another program, work is being done now to introduce into the national economy high efficiency helio-technical installations for supplying heat to houses and municipal facilities. Developments are being implemented on the basis of comprehensive programs to create high-yield kinds of cotton, new efficient fertilizers, defoliants and to expand the raw materials base for nonferrous metallurgy.

Comprehensive programs are the most important, highly efficient forms of science planning as well as its close ties with production. Therefore, the Republic Gosplan, the USSR Academy of Sciences and scientific organizations have assigned it the highest priority importance at present.

But, of course, comprehensive programs do not cover all development work in the republic in scientific-technological progress. One important form for organizing scientific-technological research is their implementation on the basis of economic contracts concluded between scientific establishments, VUZ and enterprises. This will increase considerably the responsibility of scientific establishments for timely, high quality and efficient fulfillment of orders, and the interest of production organizations in introducing the results of completed developments into production.

In the last 5 years, the volume of scientific-technological developments done on economic contracts increased considerably in our republic. At present, over 20 percent of the total expenditures for science is for contracts which is double that in 1970.

In accordance with the decrees of the party and directions of Comrade L. I. Brezhnev on the necessity of improving the management of science, a system of measures was implemented in recent years in Uzbekistan to improve the management of scientific establishments.

A science and technology administration was created in the Gosplan of the republic whose main attention was directed toward improving the planning of scientific research as applied to problems of organic ties between science and production, and to shortening the times of the introduction of new equipment and the completed scientific-technological developments into practice.

A Republic Interdepartmental Council was organized to coordinate plans to introduce the achievements of science, technology and advanced experience into agriculture. The Republic Council for Coordinating Scientific Research in Natural and Social Sciences at the Uzbek SSR Academy of Sciences began functioning.

All these measures to improve the management of science will absolutely play a positive role in increasing efficiency in the light of the problems posed by the 24th and 25th congresses and the subsequent plenums of its Central Committee, the 19th Uzbek party congress and the respective decrees of the Central Committee of the Uzbek party and the government of the republic. [33-2291]

2291
CSO: 1861

RESEARCH AND DEVELOPMENT PLANNING EXPERIMENT IN ELECTRICAL EQUIPMENT MINISTRY DESCRIBED

Tallin KOMMUNIST ESTONII in Russian 19 Jun 80 pp 34-38

/Article by V. Ambrozius, graduate student at the Institute of Economics of the Estonian SSR Academy of Science: "Efficient Use of the Achievements of Science and Technology"_7

/Text_7 A decisive factor in raising the efficiency of public production is the speeding up of scientific-technical progress; but this cannot be accomplished without improving the economic mechanism. The decree of the CPSU Central Committee and the USSR Council of Ministers "Concerning the Improvement of planning and strengthening the influence of the economic mechanism upon raising the efficiency of production and quality of work" calls for several measures to improve the mechanism for managing the development of science and technology and to strengthen the economic levers for hastening this process.

In accordance with the decision of the USSR government, scientific-research, planning and designing and technological organizations and also the enterprises and associations of the ministries, in particular the USSR Ministry of the Electrotechnical Industry, were switched in 1969 to a new system of planning, financing and economic incentives for work in creating, assimilating and adopting new equipment. Simultaneously an experiment was organized in this sector, the goal of which was to improve the management of scientific-technical progress and to strengthen the economic motivation for creating and adopting highly efficient equipment.

Initially the planning of scientific research and of creating and adopting new equipment was complicated and unwieldly. The intrasectoral plan for the development of science and technology in industry incorporated a list of several thousand topics, which were taken from the plans for new equipment of more than 100 scientific-technical organizations and 300 industrial enterprises, which were poorly inter-coordinated and synchronized, were often duplicated, and the organization served as the subject of the planning rather than the topic of research.

During the course of the experiment the scientific-research, designing and planning and technological organizations of the ministry were switched to the cost accounting [khozraschet] system for organizing work, which is now done on the basis of authorizing orders (contracts). The authorizing orders outline the final results of the planned research (including economic savings), the executors and time periods for fulfilling the work at all stages - from the scientific research to the adoption of the results into production, and also the necessary material resources, the amounts and sources of financing and economic incentives.

The reordering of the system of planning the development of new equipment was accompanied by organizational changes and a beefing up of the network of scientific-research institutes and design bureaus.

The comprehensive approach to planning and hastening the development of science and technology also made it necessary to change financing procedures. Before switching to the new system there were four sources of financing:

1) budget appropriations,
2) deductions for the assimilation of new equipment
3) deductions for scientific research
4) funds received from customers for performing contracted work.

The previous system had several restrictions, for example it did not permit financing scientific-experimental work from funds for the assimilation of new equipment, which created additional difficulties in organizing scientific research.

Starting in 1969 the development of new equipment in the electrotechnical industry was financed from two sources: the unified fund for the development of science and technology that was being created in the ministry and assets received from customers for the fulfillment of contract work.

For example, at the Tallin Electrotechnical Plant imeni M. I. Kalinin scientific-research, planning, designing and technological work, which were included in the plan for the development of new equipment, were financed in the period 1971 through 1976 in the following manner:

	1971	1972	1973	1974	1975	1976
From the unified fund, in thousands of rubles	965.5	993.0	1068.0	1313.2	1388.1	1822.9
From funds received for contracted work	352.1	487.0	496.0	346.0	327.8	286.9
Total:	1317.6	1480.0	1564.0	1659.2	1715.9	2109.8

The formation of a unified source of financing the development of new equipment has made it possible to concentrate resources on the main trends of scientific-technical progress, to more efficiently coordinate the work of the institutes, design bureaus and plants and to strengthen the ties between the creators and users of the new equipment and the ministries; it has also created conditions for the confirmation of cost accounting methods in managing scientific-technical progress.

As the experience of the USSR Ministry of the Electrotechnical Industry and others has shown, the formation of the new fund promotes a speeding up of technical progress in the sector and raises the efficiency of scientific research. Due to the experiment the time periods for drawing up and assimilating the new kinds of product in the system of this ministry were reduced 1.5 to 2-fold. But even here there are large reserves for improving the system of financing scientific-experimental activities of the scientific-research institutes and the design bureaus and for strengthening the influnce of the economic levers.

In accordance with the abovementioned decree of the CPSU Central Committee and the USSR Council of Ministers, in the near future it is planned to create a unified fund for the development of science and technology in all industrial ministries; from this fund assets will be allocated both for scientific-research work and for the assimilation of new equipment.

One of the most important measures connected with the transfer of the ministries to a new system of planning, financing and economic incentives for the development of new equipment, is the introduction of the intrasectoral system for certifying product in these ministries. All product that is subject to certification is divided into three categories:

-highest (according to technical and economic parameters and quality of execution the product exceeds the best domestic and foreign models or meets them and is competitive on the world market);

-first (according to the same indicators the product meets modern requirements of the national economy);

-second (according to the above technical and economic indicators the product does not meet the above requirements and is subject to removal from production within established time periods).

In the ministries, main administrations, associations and enterprises a unified indicator of technical-economic level and quality of manufactured articles has been introduced - the amount of highest category of quality product and its percentage in the total amount of products to be marketed. Product quality has become one of the basic indicators of the economic activity of industrial ministries and an important factor of fund forming. The percentage of highest category quality product at the Tallin "Estoplast" Plant according to the plan is, for example, 25 to 50 percent. If the plant overfulfills the plan for the output of this product by one percent, the material incentive funds will be increased by 2.5 percent. If the plan is underfulfilled by one percent, the material incentive fund is reduced by 6 percent. As a result of the new system there has been a significant increase in the percentage of highest category quality product at the plant. By the way, the time periods for the certification of manufactured articles and for awarding the State Mark of Quality are too drawn out (at the "Estoplast" Plant it takes two years on the average). Apparently, it would be wise to take another look at the time periods and reduce them significantly. As a result of the experiment the plant in recent years has been more energetic in updating its assortment of product (for example, in 1975 in the range of 30 percent).

The decree of the CPSU Central Committee and the USSR Council of Ministers concerning improving planning and the economic mechanism calls for an increase in markups to the wholesale price for new highly efficient products of a production-technical designation and for products bearing the State Mark of Quality; the decree also calls for the use of discounting of outdated product amounting to 50 percent of the total profit from its sale. Such a system is being disseminated for manufactured articles that have been certified on a non timely basis.

Fundamental changes have been made to the system of economic indicators for the creation and adoption of new equipment. In the research institutes and design bureaus they will form three funds for economic incentives: for material incentives, for social and cultural measures and housing construction and also for the development of the organization. At industrial enterprises they will create a fund for material incentives for the creation of new equipment.

At the enterprises, research institutes and design bureaus these funds (except for the fund for development) will be formed from the following sources:

1. Deductions from the enterprise's profits obtained as the result of using new scientific and technical solutions, which were designed in the organizations and enterprises of the ministry and which led to an actual reduction in the production cost of the product (15 percent of the amount of savings).

2. Deductions from above-plan profit established as an incentive markup to wholesale prices for new manufactured articles of the highest category of quality (according to an established scale depending upon the economic savings).

3. Assets included in the estimated cost of scientific-research and planning and designing work. The amounts of these assets are established in accordance with the economic savings obtained as the result of carrying out specific measures in the national economy (if it is impossible to establish the economic savings, the amounts can amount to as much as 20 percent of the planning wage fund).

Twenty percent of the total sum of the incentive funds is put into a centralized bonus fund of the ministry; the remaining portion is distributed among the enterprises and scientific organizations depending upon how much work they did. In this manner the economic stimulation of the development of science and technology is made directly dependent upon the actual output of new manufactured articles, the national economic savings from the adoption into production of progressive equipment and technology and upon the annual savings in the sector of industry. In the electrotechnical industry the new system of incentives is providing, for example, an annual 20-percent growth in national economic savings.

During the years of the experiment the growth rates of the total annual economic savings in this sector due to the assimilation and adoption of new equipment increased nearly 4-fold, having exceeded the rates of increase in deductions for the material incentive funds. The growth rates of the output of highest category quality product also increased four times faster than the total volume of product on the whole for the sector.

In the Tenth Five-Year Plan the development of science and technology was planned more comprehensively. The present-day stage in the development of production forces is characterized by the deep penetration of science into the process of public production. The interconnected complex "science - technology - production" is now one of the basic forms for improving the assets, objects and methods of labor and the development of the entire national economy.

The planned nature of the socialist economic system, which is based on the public ownership of the means of production, makes it possible to more fully use the achievements of the scientific-technical revolution thereby hastening the development of production forces of socialism and raising the efficiency of production. However the advantages of the socialist method of production are not realized automatically. There is a need for the systematic improvement of production relations and methods of managing the development of science and technology, and the adoption of their achievements into production.

Unfortunately, such questions as raising the technical level of of production, realizing the achievements of scientific-technical progress and raising the efficiency and quality of production in a broad sense are still often viewed in isolation and are not adequately coordinated with the entire process of reproduction. The decree of the CPSU Central Commitee and the USSR Council of Ministers brought attention to all of this.

The compilation of plans for the development of science and technology is only part of the planning of scientific-technical progress, at the basis of which rest the systems of indicators of all sections of the national economic plan. However, this methodological principle does not fully meet the requirements of the comprehensive management of scientific-technical progress.

The indicators of scientific-technical progress, which are dispersed throughout all sections of the plan, do not give a clear picture of the final results or of their national economic effectiveness; whereas the decisions of the 25th CPSU Congress direct all management and planning activity at achieving high final national economic results. Therefore it is quite important to define the most efficient means for managing scientific-technical progress and the changes required for planning and the other elements of the economic mechanism.

Scientific-technical progress is primarily a problem of the structural policy of national economic planning and the concentration of resources on the most important trends of production and reproduction and the development of science and technology. The completeness of plans for scientific-technical development is expressed in the fact that they contain the basic indicators, which are closely connected with all sections of economic plans. These indicators must show: a) provision for the process of creating, assimilating and adopting of new equipment with all kinds of resources (work force, materials, capital investments, capacities and financial assets) with consideration of all expenditures; b) a comparison of expenditures with the economic savings from carrying out scientific-technical measures and its impact upon the final results of fulfilling the other sections of the plan; and c) the social consequences of scientific-technical progress, including improvements in working conditions and strenthening efforts to protect the environment.

Plans for the development of science and technology must specify the forms and amounts for stimulating scientific -technical progress and the means for improving the management of this process as an element for improving the entire national economic mechanism. Moreover the basic links of the unified plans for scientific-technical development should be interconnected programs for the manufacture and use of the most important kinds of new equipment, the creation, assimilation and distribution of machine systems, comprehensive mechanization and automation of production.

The unified plans and programs for the development of science and technology must at all levels be coordinated with the comprehensive system of quality control. For it is the comprehensive plans, the drawing up of which is of a programmed nature, that make it possible to concentrate on final social-economic results. As L. Gatovskiy writes, all of this requires making the appropriate changes in the system of indicators of plans at all levels, including the technical industrial financial plan. [*]

Now we have basically defined the indicators of national economic savings and the extent that the requirements of the economy are satisfied. At the basis of all indicators rests the estimate of the national economic savings, which is performed according to the methodology for determining the efficiency of the new equipment, inventions and proposals for improving production methods, without which it is impossible to thoroughly justify the decisions that have been made, that have been adopted into production. For example, in the course of the experiment at the Electrotechnical Plant imeni M. I. Kalinin the national-economic savings from using new manufactured articles bearing the State Mark of Quality increased from 14,550,000 rubles in 1971 to 14,124,000,000 rubles in 1977.

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[*] See L. Gatovskiy. Strengthening the orientation of plans and incentives toward highly efficient new equipment. VOPROSY EKONOMIKI, 1977, No 5, p 116.

According to data of the USSR Gosplan, 10 ministries have used the new system. As a result scientific-technical progress has been speeded up, the time for realizing the achievements of science and technology has been reduced, the output of highest category quality product and its percentage of the total of production has increased, and the national economic savings from the assimilation and adoption of new equipment has risen.

A shortcoming of the experiment is that it takes at least several years to carry it out. It is also a costly measure, which in many cases can lead to a reduction in product output and an increase in expenditures because of the large amount of estimating and analytical work. The shortcomings, however, can be eliminated by experimental estimates based on specific numerical data. It is kept in mind that at the same economic facilities and enterprises, in the sectors of industry and in the regions where the economic experiments are being conducted, due to the estimates one can study the large number of proposals in many different combinations. What is more, an economic experiment that is based on numerical indicators makes it possible to rapidly and without special expenditures perform research. One of these is the machine experiment that was conducted in the Central Economic and Mathematics Institute of the USSR Academy of Sciences for the purpose of drawing up an economic mechanism for scientific-technical progress.

The experience of the experimentation shows that changing the economic mechanism provides positive results only by taking a comprehensive approach to it. The substitution of one evaluating or fund forming indicator with another, more progressive indicator does not always lead to positive results; for this reason it is necessary to change the entire system of indicators. In the course of the experiment it was impossible to study all possible interconnections. In a machine experiment this is fully feasible. In addition the advantage of such a method of research is the ability to exclude the affects of secondary factors that are not connected with the experiment.

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HEAD INSTITUTE SYSTEM PROBLEMS DESCRIBED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 Apr 80 p 2

[Article by V. P. Pokrovskiy, chief of the Department of Organization and Economics of Scientific-Technological Research of the USSR Government Committee on Science and Technology: "Head Institute"]

[Text] Among industrial scientific research institutes, approximately every fourth one has a special status -- it is the head institute for this or another problem. The scale of the problems may be different -- from general union ones to ones touching upon the interests of one subsector or even concerned with the output of one type of product. The essence of this does not change -- the head NII [Scientific Research Institute] must be the main striking force in the solution of their problems.

Do they cope with the role assigned to them? This is a very important question: in its time, there were many doubts about the very idea of assigning problems to head institutes. Today such doubts are behind us. The experience of past years indicates that the activities of head institutes facilitated an increase in the production level, the creation of new equipment and technology, a reduction in costs , and a saving of material resources. Unlike the usual research organizations, head NII directly influence the formation of a single technological policy in the industry based on their high scientific potential -- within their walls each fourth-fifth scientific staff worker is a doctor or a candidate of sciences.

The VNII [All-Union NII] of Electrical Machine Building can be cited as an example. Our power engineering is greatly indebted to this head institute of the Minelektrotekhprom [Ministry of the Electrical Equipment Industry] for its constantly improved equipment. But, at the same time, it develops comprehensive industrial programs to create long-range electrical machinery and organizes their implementation at all basic stages -- from exploratory research to series production. For this purpose, in particular, the institute issues orders to coexecutor organizations, finances their work according to comprehensive programs, and accepts the results of this work. As far as the coordination of the activities of all the participants is concerned, it is based on a general directive schedule according to which the coexecutors plan their work. The clear-cut interaction of the partners from various ministries and departments is also helped by the party organization of the head institute, maintaining constant contacts with the party organization of the coexecutors. But a scientific leader and a chief designer of the program are constantly monitoring the entire progress of work implementation.

It can be argued that the VNIIelektromashinostroyeniye example is not typical -- this institute long ago won the reputation as one of the leading collectives in the country. But here are the results of the investigations of several tens of head NII for three years of the five-year plan period. They indicate that the time for carrying out and introducing scientific-technological developments was reduced by an average of 10 percent, while their efficiency increased by 10 to 15 percent.

Especially good results were obtained by collectives of head NII that changed over to the new system of planning, financing and economic incentive -- evaluating activity by the actual economic effect of introducing the development. Even when an indicator is taken of correspondence of the development to the world level, these institutes are unequaled. In particular, of the total number of licenses sold abroad, almost half are shared by institutes of the Minenergomash [Ministry of Power Machinery], Minstankoprom [Ministry of the Machine Tool Industry], the USSR Mintsvetmet [Ministry of Nonferrous Metallurgy], and the USSR Minneftekhimprom [Ministry of the Petrochemical Industry] that changed over to the new system.

It would be erroneous, however, to evaluate the condition of the matter by the average results. Regrettably, there are still many serious shortcomings in the work of many head institutes. While the main one is a poor influence on increasing the efficiency of production and improving the quality of the products, the most dangerous is paying insufficient attention to the long-range situation.

In more than half the head NII, developments done at a low technical standard were detected. Nor was it difficult to find the reasons -- poor utilization of scientific-technical data, a formalistic approach to carrying out patent searches and technical-economic substantiations. Of concern is the fact that almost half the patent applications applied for by head institutes were rejected, basically due to a lack of novelty. Also, of the developments completed in recent years, less than 20 percent have been patented. Many head NII sold not one license.

One should not be surprised at this: a number of head NII still do not pay the proper attention to creating equipment of the future. Thus, in eight of the institutes checked, the share of long-range work was less than 10 percent. In the Ts-NIIbumagi [Central Scientific Research Institute of Paper] of the Minbumprom [Ministry of the Paper Industry], money assigned directly for creating progressive equipment does not exceed 8 percent year after year. Taking into account the low level of domestic equipment in this industry, this situation can hardly be considered normal.

As before, introducing into production remains the "Achilles heel" of many head institutes. Last year, for example, one third of them did not transfer over half their developments to industry. Of special concern is another thing: among the unutilized developments there were many patented in the USSR and various countries. Also, up to 40 percent of the inventions in many institutes, patented abroad, are still not being used in this country. Thus, for example, the VNII for Comprehensive Problems of Machine Building for Animal Husbandry and Feed Production of the Minshivmash [Ministry of Animal Husbandry Machinery] introduced only a third of such developments. The Government Scientific Research Power Institute imeni G. M. Krzhizhanovskiy introduced only a fifth of the patented inventions.

Also of concern is a trend noted in increasing the introduction time compared to the time taken for the developments themselves. If one takes into consideration that the parameters of the new equipment are established at the start of designing, any delay in its introduction automatically creates doubt in the technical level of future products. Moreover, for example, the introduction into production of the technology created by the Institute of the Pipe Industry for manufacturing pipe by the pressing method, although it makes it possible to reduce by 25 to 30 percent the pipe walls and increase their life at the same time, has already waited for over ten years. A technology for making bimetallic pipe whose wear resistance is 5 to 10 times greater than pipe made of hydrocarbon steel was created by this institute in 1973 and is not being introduced.

It would have been very simple to explain these shortcomings by the low organizational and scientific management within the walls of the head institutes themselves. Especially since there are many reasons for this.

However, it is our opinion that the roots of many errors in the activities of head institutes are considerably deeper -- in the work of the apparatus of corresponding ministries and departments. Their insufficient attention to industrial science is manifested by the fact that most head institutes are still poorly equipped with experimental bases, modern test installations, devices and apparatus. Over half the organizations must build new experimental bases and expand existing ones. And where the necessary capacities are available, for example, at experimental facilities of the VNII of Medical Device Building of the Minmedprom [Ministry of the Medical Industry], the VNII of Transport Construction of the Mintransstroy [Ministry of Transport Construction], they are frequently loaded with series manufactured products.

There are also more serious complaints about ministries and departments. Many of them actually withdrew from monitoring the basic directions of the activities of scientific research organizations and do not improve the network and work subjects of scientific establishments for long-range development of the industry.

In the USSR Minchermet [Ministry of Ferrous Industry], the USSR Minsel'khoz [Ministry of Agriculture], the USSR Mintsvetmet, the Minmedprom and the

Minstankoprom, the practice of planning the entire cycle of work -- from scientific research to introduction into production are still not being used, and schedules for creating new equipment and plans for production are poorly correlated. The experience of target program planning with work financing through head NII is being expanded very slowly in the area of industrial science.

In the course of checking, facts have been found where, to benefit their immediate needs, ministries direct head NII to solve particular problems to the detriment of serious long range problems. With the approval of the ministry, the Siberian Scientific Research and Planning Institute of Natural Gases of the Mingazprom [Ministry of the Gas Industry] is doing a number of small works to automate production control and individual technological processes, and is doing economic and norm research. Yet, until recently, it did not occupy itself with such a large problem as the development of the gas industry in Siberia and the Far East.

It should be stressed that the shortcomings mentioned above are typical for most head institutes. There are ways to eliminate them. On the eve of the new five-year plan period, it is urgently necessary to make more precise the main directions of the activities of head NII, concentrate their efforts on the comprehensive solutions to problems related to raising the technical standards of production and the quality of the products. Correspondingly, in planning capital investments and allotting material and financial resources, target programs must be provided, first of all, on the most important scientific-technological problems and other work in the area of creating new equipment.

All the premises for this are available today. In particular, having analyzed the results of checking the activities of the head institutes, the USSR State Committee on Science and Technology, with the participation of interested ministries and departments, introduced changes and additions to the "General statute on scientific research, design planning, design and technological organizations." Full responsibility for scientific substantiation of proposals they introduced is now imposed on scientific-technological policy in industry.

Their rights have been correspondingly expanded considerably, for example, in determining facilities for capital investments, material-equipment expenditures and in selecting scientific managers. Additional rights were given to head NII in the area of influencing the organization of the coexecutor -- through the mechanism of financing work orders, programs or individual tasks, their acceptance and evaluation of efficiency through participation in setting wholesale prices for new equipment and the determination of bonuses for these enterprises. All these rights will enable head institutes to become true leaders in scientific-technological progress in their industries. But for this they must be helped to realize the possibilities which have opened up.
[32-2291]

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IMPROVEMENT OF ACADEMY-INDUSTRY COOPERATION IN BASIC RESEARCH PROPOSED

Moscow KHOZYAYSTVO I PRAVO in Russian No 4, 1980 pp 63-67

[Article by M. Bashin, candidate of economic sciences: "To Bring the Effect of Efficiency Nearer"]

[Text] Speaking at the November (1979) Plenum of the CPSU Central Committee, Comrade L. I. Brezhnev noted: "In performing the urgent tasks that face the economy, especially at the threshold of the next five-year plan, the party counts on active aid from our scientists--from the USSR Academy of Sciences, from republic and ministerial academies, and from all scientific-research institutes. The State Committee for Science and Technology must work more energetically."

The organic combination of the achievements of the scientific-technical revolution with the advantages of the socialistic economic system is tied with an even more active inclusion of the results of fundamental research in this process. Fundamental research must give a strong impulse at the initial stage of the long and complicated cycle of "science--technology--production."

The decree of the CPSU Central Committee and USSR Council of Ministers of 12 July 1979, No 695, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality," stressed the necessity for using the results of fundamental and applied research in the solution of the most important scientific-technical problems in the process of complex utilization of natural resources.

Raising the effectiveness of fundamental science and increasing its contribution to [illegible]ing the tempo of scientific-technical progress are achieved, in partic[illegible] the formation of complex organizations within the framework of the USSR Academy of Sciences and the academies of the union republics; the activity of these complex organizations permits the association of the efforts of scientists and production specialists.

The range of cooperation achieved with industry by organizations of the USSR Academy of Sciences is revealed by the following data. Organizations of the Siberian Department of the USSR Academy of Sciences have scientific-technical cooperation with more than 320 enterprises of various branches of the economy and, in the ninth five-year plan, proposed more than 700 completed scientific works for introduction into the economy;[1] the volume of contract work in 1975 in comparison with 1970 grew by a factor of 1.5 (and according to preliminary data, it increased still another 30 percent by 1979). Owing to fundamental research done at the Ukrainian Academy of Sciences in cooperation with ministerial science, industry during the last five years has received more than 300 new technological processes which are being utilized successfully in various branches of the economy.

Wide experimentation conducted in recent years on the selection of rational forms of relations between academy science and production has been fully justified. Thus, in one case, scientific results are handed over directly to an industrial complex; in another case, the participation by an applied-science institute with a strong experimental base is necessary; in the third case, it is important to establish long-term creative relations between USSR Academy of Sciences organizations and enterprises.

On the initiative of the Ukrainian Academy of Sciences, scientific complexes have been created. These are academic scientific-technical associations (ANTO). They are composed of institutes, large design bureaus, and experimental shops, and they permit the organization of a complete circle: fundamental scientific discovery, invention, experimental model, and serial production of new technology. An example of such a complex is the Institute of Electric Welding imeni Ye. O. Paton of the Ukrainian Academy of Sciences.

All the same, the path from scientific discovery to utilization in practice, which often is not only long but thorny, can be significantly shortened and optimized if the branches of the economy also help build bridges "from their own shores" to academy-type scientific collectives. An illustration here is the introduction of the results of fundamental research in the field of submillimeter spectroscopy. Cooperative work of the Physics Institute imeni P. N. Lebedev of the USSR Academy of Sciences, the Radiophysics Scientific-Research Institute at Gor'kiy, and a number of ministerial scientific-research institutes and head enterprises has permitted the rapid introduction into production of a new type of electronic generator which has a high economic effect.

The broadening and deepening of creative teamwork between academy science and production push to the forefront the problem of improving the economic mechanism through the transfer of scientific results. At the present time, the Instruction on the Transfer of Materials on Inventions by Scientific Organizations of the USSR Academy of Sciences to the Economic Ministries is operational.[2] However, real ties between the USSR Academy of Sciences organizations and industry are significantly broader and are not limited to the transfer of inventions.

The Typical Statute on the Procedures for Concluding Economic Agreements and the Delivery of Intraministerial Orders for the Conduct of Scientific-research and Experimental-design and Technical Work[3] basically regulates the process of conduct of scientific-research work (NIR) and experimental-design work (OKR) without consideration of the mutual relations of the parties in the process of introducing the results of fundamental research.

The above statute (par. 6) provides that academic organizations perform NIR and OKR according to agreements with requestors above the amount of NIR expenditures established by the plan and receive from the requestors the payment of funds necessary for fulfilling the work.

In practice, a number of questions arise that are related to the material-technical supply to academy organizations of equipment, expensive apparatus, instruments, stands, etc., without which a high scientific-technical level of transferable results cannot be guaranteed.

In recent years, the funding of scientific work in academy organizations has risen significantly,[4] but their experimental-test base still does not meet the needs that have arisen (more than half of the developments being offered for introduction into production by organizations of the USSR Academy of Sciences cannot be recommended by the USSR State Committee for Science and Technology for exploitation because of design and technological deficiencies).[5] Therefore, the demand constantly arises for special equipment and other technical supplies which only the requestor can provide. In such a situation it is necessary to transfer basic resources to USSR Academy of Sciences organizations for, as a rule, permanent use.

This is particularly characteristic for heavy and power machine building, radio technology industry, nonferrous metallurgy, and other leading branches of the economy. It is economically inexpedient to return these basic resources after completion of the contract work inasmuch as the performer receives similar orders from other economic ministries. These questions are not reflected in the applicable normative documents.

The hastening of creative teamwork between scientists and production specialists makes possible the allocation of various kinds of special services --the transfer of funds, the issue of guarantees of temporary quarters to the performers, the provision of subsistence in remote regions of the country, the allotment of transportation, etc. However, the transfer of basic resources is not provided for by the instructions. Therefore, some finance workers look upon such contacts as "accidental" relations, bordering on "dangerous." The managers of those organizations which most actively support the union of science and production are considered violators, inasmuch as normative acts in the field have not caught up with new forms of cooperation between science and production.

It is notable that in older enterprises with well-developed accounting staffs and efficient legal services, the frequency of such conflicts in comparison with younger enterprises and new projects is significantly higher. This is characteristic of the Siberian affiliate of the production association "Tekhenergokhimprom," the Kuznetsk metallurgical combine, the Tashtagol mine (Permskaya oblast), the "Sibsel'mash" plant, the Odessa plant for decorative-construction machines, enterprises of the radiotechnical and chemical industries, and others.

The questions referred to are not clarified by the Methodological Instructions for Determining the Value of NIR Conducted by USSR Academy of Sciences Institutions under Agreements with Requestors and on Procedures for Formulating These Agreements, which were prepared in 1972 by the planning-financing administration of the USSR Academy of Sciences. Without official agreement by the USSR State Committee for Science and Technology and the Ministry of Finance, this document does not obligate the economic ministries.

The specifics of creative cooperation between USSR Academy of Sciences organizations and industrial enterprises are also not accounted for in the decree of the USSR Council of Ministers of 27 August 1971, "On Raising the Mutual Economic Interest of Enterprises and Organizations in the Transfer of Their Scientific-Technical Achievements and in the Utilization of Adopted Advanced Experience."

In searching for legal alternatives, material-technical supply workers must turn to the operative legislation of the USSR on the question of the material-technical support of the USSR Academy of Sciences and to certain partial explanations of USSR Gosarbitrazh in which can be found individual statutes permitting acceptable solutions in the interest of cooperation.

In 1978, the USSR State Committee for Science and Technology and the Presidium of the USSR Academy of Sciences adopted regulations defining the basic principles for cooperation between scientific organizations of the Siberian Department of the USSR Academy of Sciences and ministerial NIIs, KBs, and SKTBs. It covers a wide circle of organizational forms for the creative teamwork of Siberian scientists with ministerial science. However, the document referred to has a local character, as it pertains only to one scientific region--Siberia and the Far East.

In this connection, it occurs to us that it would be expedient to prepare a single normative document that would regulate the relationship between academy science and requestors and that would be obligatory for all participants in the assimilation of fundamental scientific achievements.

As practice has shown, it would be a mistake to apply the normative acts that pertain to applied research and development to the sphere of fundamental research without considering the forms that have arisen in relations between academy organizations and production, and to ignore their specific interests and needs. Various stages of the "science--technology--production" cycle have their own legal and economic relations which require independent regulation.

It appears that attempts to use the Typical Agreement for Conduct of NIP and OKR to apply to the introduction of fundamental research cannot be considered successful. The existence of a uniform Typical Regulation and Typical Agreement would not exclude but rather assume the right of interested parties in an agreement to take into account to a significant degree the peculiarities of the conduct of work on introducing the results of fundamental research into practice.

For further strengthening of cooperation between academy science and industry, it would be effective to develop contractual relations in those directions of scientific research in which the results have matured to the point where they can be realized in the economy.

One must agree with A. Bachurin, who expressed the thought about the gradual development of an "order-agreement" system in the sphere of fundamental research. Inherent in it are economic methods for active control over the standards of research being conducted.[6]

The role of agreements on cooperation between USSR Academy of Sciences organizations and industry is growing, first of all, in the solution of large and complex scientific-technical problems which have broad manifestations in the economy. Scientists of the USSR Academy of Sciences Siberian Department, for example, involve themselves in such work only when a cooperative agreement is signed by the director of the corresponding institute and minister (or deputy) that guarantees wide introduction of new scientific ideas into practice. In this connection, the branch of industry not only finances the research from the unified fund for the development of science and technology, but also supplies the scientists with special equipment and materials and strengthens the experimental-testing base for research.

In our opinion, the active means for increasing the interest of academy organizations in the introduction of scientific results into practice is the introduction of an efficient system of planning and financial stimulation. The Siberian Department of the USSR Academy of Sciences has had positive experience in its functioning. Thus, in 1972 three organizations--the Institute of Hydrodynamics, the Institute of Semiconductor Physics, and the Mining Institute--were transferred (as an experiment) to the system based on the principle of making financial stimulation of the scientific collective directly dependent on the economic effectiveness in utilizing scientific achievements.

During the five-year conduct of the experiment, the creative teamwork of scientists and production specialists was strengthened, and the accumulated scientific potential was better used. It is apparent that this experience should be carefully studied and gradually expanded to those organizations of the USSR Academy of Sciences whose subject matter is close to the sphere of material production.

At the same time, it is important to provide for definite financial and other sanctions against those academy organizations that "recycle" in new contracts the applied results already fully paid for by the first sponsor. Financial-inspection services in many instances fix settlements of large sums, not corroborated by corresponding expenditures, to the accounts of USSR Academy of Sciences organizations. In practice, this leads to their unjustified enrichment.

Certain economists and legal experts consider that the developing ties between academy science and industry must have the character of the "output for a branch of the economy." One can agree in principle with this approach. Actually, only the staff of the economic branch is able to formulate scientific-technical policy in the long term. However, one should not forget that the realization of scientific achievements, in the final analysis, comes down to the actual enterprise. Therefore, the sides of an agreement for cooperation are not the USSR Academy of Sciences and an economic ministry but an academy organization and an industrial enterprise (scientific-production or production association).

In legal literature, it has been noted that the key legal factor of cost accounting in science is the agreement for conduct of NIR and OKR. Evidently, it is more correct to consider that this quality is inherent not only in the conduct of research but also during the introduction of results into the economy. If earlier, the results of applied research and development were the subject of agreements, such agreements in the last 10-12 years more and more have involved also the sphere of fundamental research. It seems that an agreement for introduction of the results of fundamental research must be the basic form of cost accounting relations, within the framework of which academy organizations deservedly accomplish the introduction of their achievements as an instrument of economic stimulation for raising the effectiveness of introducing the results of scientific search and to show decisive influence on the formulation of the composition, objectives, and contents of plans for the introduction of science into the economy.

In an agreement it is necessary to regulate clearly the accounting procedures for cases of unforeseen work delays relating to specific conduct and completion of fundamental research, the distribution of share participation of organizations in the economic effect, and other questions. In our view, the Typical Agreement for the Introduction of Fundamental Research Results could be prepared with participation by the USSR State Committee for Science and Technology, the USSR Ministry of Finance, the USSR Academy of Sciences Institute of State and Law, the USSR Academy of Sciences Institute of Economics, and also leading economic ministries and agencies. The source of financial stimulation of scientists can be the unified fund for science and technology of the sponsor's branch of the economy.

With the aim of replenishing working funds for academy organizations it is expedient, in our opinion, for part of their expense to be covered by bank credit.

Not all progressive technological solutions are introduced immediately on a sufficiently wide scale, because the needed industrial interest is sometimes absent. Thus, the technology for rapid electric heat treatment of steel wire for a long time was not realized by metallurgical enterprises. The opinion was expressed in the press that the reason for such a situation was the absence of clearly formulated criteria for the analysis and evaluation of the technological solutions being used in industry and offered by academy institutions.[7]

We consider that it is necessary to financially stimulate the ministerial NIIs and KBs that are successfully applying in their developments the scientific results of fundamental research.

Life suggests that working out effective economic and legal mechanisms for the introduction of scientific-research results plays an increasingly important role, because only by this route can the economy realize the great potential of fundamental science. This is addressed by the decree of the CPSU Central Committee and the USSR Council of Ministers, "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality," in which is stressed the importance of all-sided development of fundamental and applied research, of the application of cost accounting principles to academy organizations (the part of their work being performed for industry), of strengthening the significance of economic key factors and stimuli (gradual transition of USSR Academy of Sciences scientific organizations to the system of payment for results fully completed and accepted by the sponsors of work done on the basis of contracts).

FOOTNOTES

1. PRAVDA, 1977, 11 February

2. Put into force by a decree of the State Committee of the USSR Council of Ministers for Science and Technology on 10 October 1976.

3. Confirmed by a decree of the State Committee of the USSR Council of Ministers for Science and Technology, No 360, 5 August 1969.

4. For details, see M. Bashin, "Finansovaya strategiya v sfere fundamental'nykh issledovaniy" ["Financial Strategy in the Sphere of Fundamental Research"], FINANCY SSSR No 1, 1978 pp 23-25.

5. See EKONOMICHESKAYA GAZETA No 47, 1979 p 9.

6. See A. Bachurin, "Planovo-ekonomicheskiye metody upravleniya" [Planning-Economic Methods of Control"] Moscow 1973 p 296.

7. See B. Paton, "Rychagi progressa" ["Key Factors of Progress"], PRAVDA 1979, 27 November.

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EXPANDED ROLE OF UNIVERSITY RESEARCH ON SCIENTIFIC-TECHNICAL PROBLEMS IN THE ECONOMY

Moscow VESTNIK VYSSHEY SHKOLY No 1, Jan 80 pp 3-8

/Article by I. M. Makarov, associate member of USSR Academy of Sciences, deputy minister of Higher and Secondary Special Education, USSR, "To Increase the Effectiveness of Research"/

/Text/

In implementing the extensive program envisaged by the 25th CPSU Congress for further developing the economy of our Motherland, for increasing the effectiveness of production and the quality of products, and for the growth of the welfare and culture of the Soviet people, the rate of scientific-technical progress and acceleration of utilization of the achievements of science and technology in the national economy are of decisive significance. The Soviet university, with its highly-skilled scientific-pedagogical staff, is called upon to make an important contribution to the solution of these problems.

Rapid growth in the volume of scientific research work is a characteristic feature of the present stage of development of the university. Expenditures for research and scientific studies are growing year by year in the higher educational institutions. This dictates the necessity for continually increasing the quality of the scientific activity of the university for the purpose of increasing its contribution toward solving the urgent problems of the basic and applied sciences, and increasing the quality of the training of specialists.

The party and the government are continually devoting attention to the development of science at the institutions of higher education. As is well-known, in April 1978 the CPSU Central Committee and the USSR Council of Ministers adopted the special decree, "On Increasing the Effectiveness of Scientific Research Work in the Institutions of Higher Education". This past summer of 1979, the decree of the party and the government, "On the Further Development of the University and Increasing the Quality of the Training of Specialists" demonstrated anew the necessity for further perfecting the organization and plan-of the scientific research conducted at VUZ's /Institutions of Higher Education/, as the foundation for improving the education and training process.

Since the decree of the CPSU Central Committee and USSR Council of Ministers of 6 April 1978 was issued, a good deal has been accomplished at the universities toward its practical implementation. As is well-known, this decree introduced much that is new in principle in organizing and planning scientific activities at the VUZ's: a list has been drawn up of the leading institutions of higher education in which the new form of organizing scientific work in the VUZ is being introduced—the scientific research unit; a self-supporting scientific association has been created in Minvuz, RSFSR [Ministry of Higher Education]; resolutions have been adopted for creating inter-VUZ centers to serve scientific research, for conducting a contest for the best scientific work at a VUZ; and others. In this connection it has become necessary to review the old, and to create new regulations, instructions and other documents which regulate the organization of research at the university. At the present time, all of this work is basically complete.

Of course, study of the documents cited is important. But it is only an initial stage of this enormous project, which is being carried out and which will be conducted, for changing over to the new conditions for planning and organizing VUZ research. A great deal of time and effort have been expended in the course of this stage; now it is necessary to organize the subsequent efforts, directed toward implementing the 1978 decree of the party and the government, in a very well-thought-out and precise manner.

Implementing the measures envisaged in the decree in the area of perfecting the planning of scientific work in the VUZ's calls for special attention. The party and the government have set the task for significantly expanding the participation of the university in carrying out programs and work directed toward solving scientific-technical problems—taking part in the plans of the USSR Academy of Sciences and the academies of sciences of the union republics, in the sector and union republic plans for scientific research work and in utilizing the achievements of science and technology in manufacturing. As is well-known, at the present time planning is proceeding at full speed in all academies of sciences as well as in industrial branch ministries and departments and their leading organizations, for formulating the plans and programs for the 11th Five-Year Plan. In this connection, the rapid introduction of systems for planning research in the universities—systems which assure the extensive representation of VUZ work in these plans and programs—will become the first priority task.

For these purposes there is urgent need to organize the research themes for the coming five-year plan in conjunction with the academic and primary industrial organizations, and to select the most prominent and promising VUZ studies in order to include them in the appropriate plans and programs. The leading VUZ's are faced with especially large assignments. Reflection of the basic part of the scientific themes of these VUZ's in the nationwide, industrial sector and republic plans and programs would be a proper achievement.

The administrative organs of the universities are called upon to participate much more actively in the formulation of plans for the most important VUZ work, bearing in mind that the success of the university in the area of the development of science and new technology in the 11th Five-Year Plan depends to a large extent on the timeliness and quality of the proposals for the VUZ's participation in this most important work, and on the degree to which the rectorates and the VUZ administrative organs consistently and persistently defend these proposals before the leading organizations and ministries.

Meanwhile, it is proper to emphasize that while examining the proposals for VUZ participation in the solution of basic scientific-technical problems and fulfilling the industrial sector and republic plans for research, it is at the same time necessary to strive for support for the impending work in terms of the required quotas, appropriations and funds for material-technical resources at the expense of the interested ministries and departments.

The decisive factors for increasing the effectiveness of research work in the VUZ are, selecting the most promising scientific sectors; that is, those which have the greatest influence on the development of technology, on manufacturing, industrial and agricultural production; and concentrating available strengths and resources on these sectors. With respect to this, the establishment of complex special-purpose programs and coordinated plans for work by the VUZ's on different scientific and scientific-technical problems has very great significance.

The ministry has already approved part of the coordinated plans and programs, and development of their other parts is being carried out. These plans concern such highly important problems as, "Robots and Automatic Technical Systems", "Systems for Automated Designing", "Protection of the Environment", and "Research and Assimilation of the World Ocean". A program has been adopted jointly by the GKNT /State Committee for Science and Technology/ and the USSR Academy of Sciences on automation of experiments, and a number of others.

But this is only the beginning of the concentration of forces and resources of the higher educational institutions for the solution of urgent problems of science and technology. A number of collectives at large VUZ's are working in such important sectors as power engineering, protection of metals from corrosion, and powder metallurgy; and in order to more effectively utilize their potential, we have commenced working out inter-VUZ plans and programs which will be coordinated with the nationwide plans and programs.

Working out and implementing the inter-VUZ complex special-purpose scientific-technical programs is a complicated and highly responsible matter. A great deal of preparatory work is required here: the selection of the VUZ's and other organizations to carry out this work, which possess the staffs of skilled workers, and a scientific undertaking in the corresponding areas of science and technology; allocation of tasks according to the periods and the organization assigned to carry them out; and defining the required material and financial resources, and their sources. Considering the specific nature of the financing and the material-technical support for scientific research and development at the university, it is very important to make well-thought out selection of the scientific and scientific-technical problems for which inter-VUZ special-purpose programs are to be developed. Such problems cannot be numerous, and they must be truly the most important, key questions the accelerated solution of which will provide a significant scientific and national economic impact.

By now no one has to be convinced of the fact that training skilled specialists under modern conditions can be accomplished on the basis of active research work at the higher educational institutions. On this basis alone, new courses and lectures can be developed, modern student laboratories can be created, high-quality textbooks can be written and educational supplies obtained. And it is this factor that also determines the continuing increase in the qualification of the instructors. As a result, the educational process is enriched and students are attracted to creative work.

It is especially important to recall at this time the profound ties of science and higher education, in connection with the beginning of active preparation of plans for developing higher educational institutions in the 11th Five-Year Plan. While formulating these plans, it is necessary to allow for the intensive development of the scientific subsidiaries of the VUZ's as bases for improving the training of specialists in the future. The basic directions of the scientific activity of the VUZ for the coming five-year plan, measures for raising the theoretical level of research, creation of new scientific establishments and developing the material basis of those which exist at this time, training the scientific staff, etc., must be defined in the plans. At the same time, special attention must be devoted to the development of basic research, which represents the basis for highly-effective technical solutions, and creation of principally-new technological processes. Expansion of such research in the VUZ is especially needed in connection with the planned university level courses for training specialists with a broad background.

The development of basic research at the university is not possible without close coordination of this work with the USSR Academy of Sciences. In this connection, I would like to recall the joint session of the Presidium of the USSR Academy of Sciences and the collegium of MinVUZ, USSR, which convened in the summer of 1979, at which the tasks were discussed for further strengthening the creative bonds between the universities and the institutions of the academy. The joint resolutions adopted here create a fine basis for developing collaboration between the VUZ and the institutions of the USSR Academy of Sciences. These resolutions must be supported by direct expansion of contacts at the level of VUZ-NII /Scientific Research Institution/. Perfecting the organizational forms of such contacts is also important, imparting to them a concrete, businesslike character.

A significant role in increasing the effectiveness of VUZ research must be played by the further development and deepening of collaboration of educational institutions with the organizations and enterprises of the national economy. Experience shows that research develops far more fruitfully at those VUZ's which have established firm creative contacts with the establishments of the corresponding industrial sectors. The successes of such leading educational institutions as the N. E. Bauman MVTU /Moscow Higher Technical School/, MEI /Moscow Power Engineering Institute/, MAI /Moscow Institute of Architecture/, the D. I. Mendeleev MKhTI /Moscow Institute of Chemical Technology/, MINKhiGP /the Academician I. M. Gubkin Moscow Institute of the Petrochemical and Gas Industry/, MIFI /Moscow Engineering and Physics Institute/, and the Moscow Institute of Mining, are to a large extent explained by the close mutual ties with the branch ministries, their head organizations and enterprises.

The need for developing networks of branch scientific research laboratories in the VUZ was noted in the aforementioned 1978 decree of the CPSU Central Committee and the USSR Council of Ministers. And the number of such laboratories is increasing constantly. Fifty-nine were established in 1978 alone, and they now number more than 800. Not long ago the collegium of the USSR MinVUZ examined a network of such establishments and noted the high degree of effectiveness of this form of organizing scientific work at the VUZ level. The vast majority of such laboratories are working in the area of the physics and chemistry of semiconductors, in radio-electronics, chemistry and chemical engineering, and in other modern sectors of science and technology.

At the same time there are still serious shortcomings in the work of the laboratories of many industrial sectors. Not always, for example, is their activity directed toward solving the large, long-term problems of the sector. Research projects and studies carried out in them frequently have narrow applications or are of a private nature. It is still rare for such laboratories and their departments to be established at the facilities of the enterprises and client-organizations (as the decree envisages).

The existence of firm, long-term ties of VUZ's with the industrial sectors creates favorable conditions for introducing the results of finished research into production; and this is very important: although the mount of university work which one finds put to practical use, and the economic impact from its utilization is growing constantly, one cannot consider the state of affairs in this area to be favorable. There are still quite a number of interesting, long-term studies which are capable of making a significant economic and social impact, which have not been put to practical use.

Analysis shows that the basic reasons for difficulties in the solution of these problems are the presence of interdepartmental barriers and the lack of adequate experimental production and design facilities at the VUZ's. The most important lever in the matter of accelerating the utilization of the scientific achievements in the national economy is perfecting the planning of research projects and studies. It is not by chance that the results of VUZ projects which have been carried out according to the industrial sector and republic plans for conducting research, and the introduction of achievements of science and technology to production, as a rule, yield practical results more rapidly: they are constantly under the surveillance of the interested ministries and departments; and the organizations in the industrial sector make contact with their designs and with their completed experimental-manufacturing work in a more timely manner. In addition, the necessary capacities and resources for assimilating these studies in the sectors can be planned for in advance.

Also, it is often the case that VUZ instructors who are the authors of interesting work of long-term significance to the national economy do not display the proper interest in putting their scientific achievements to practical use, and confine themselves to formal presentation of a report on the completed thesis, and scientific publication. Undoubtedly those VUZ administrators act properly who attempt to overcome such an orientation, and consider the importance of the economic and social results which come from the realization of this or that scientific study upon funding the project and allocation of material-technical resources, and defining the form of the moral and the size of the material stimuli for the scientific-pedagogical workers.

As before, one of the basic factors which reduces the effectiveness of the scientific research work in the VUZ is their lack of experimental and design facilities. After all, without the proper designing and engineering study not a single scientific-technical proposal from the VUZ, even the most valuable, can be accepted for broad introduction. And transfer of the results of the research to the industrial sector organizations for completion often delays the process of introduction for years. Additionally, the authorship of the VUZ is often lost in the process. Of course it is unrealistic and hardly expedient to figure on creating a sufficiently strong design bureau and experimental production, capable of providing the necessary "finishing" for all projects—at times, extremely diversified—at each educational institution. In this connection, the experience of establishing inter-VUZ design bureaus and experimental plants on the facilities of the very largest VUZ's in a number of republics (specifically, Kazakhstan, Belorussia and Kirgizia) deserves careful study.

Establishing inter-VUZ centers to serve scientific research should also render significant assistance in solving these problems. As is well-known MinVUZ, USSR, has adopted a resolution for constructing such a center in Dnepropetrovsk, and this center is already being designed. In the future the system of centers such as this will be expanded.

An important indicator of the originality and scientific level of their research is their protection capability and the number of certificates of authorship and patents received upon completion of the studies. One can say that on the whole the situation with respect to invention and patent-licensing work in the universities is improving from year to year. In 1978 alone, more than 11,600 certificates of authorship and 320 patents were received for inventions in the universities of MinVUZ, USSR. Six licenses were sold to foreign firms and organizations; the funds received from this are being directed toward purchase abroad of unique equipment and scientific literature.

At the same time we should not become tranquilized by the generally satisfactory nature of the indicators for this work. There are still universities where only one research fellow has received a certificate of authorship. And more than half of the claims submitted by the research fellows at certain universities are rejected by the USSR State Committee on Inventions and Discoveries because the work is not innovative; this means that large financial and material resources were spent ineffectively.

And there are cases where, because of lack of control, scientific-pedagogical workers have published the results of their finished research without the necessary patents to protect them, which leads to loss of priority and precludes the possibility of returns for these products from abroad on a commercial basis.

It is necessary to decisively contest the attitude which is still found in many universities, that patent and licensing work is of secondary importance. Practical work has shown that well-organized activitys of patent and scientific-technical information services permits significant increase in the effectiveness of research and avoids unnecessary expense. We must strive to ensure that every research topic which can be applied to industry, included in the university's plan, has the required technical-economic backing and receives thorough preparation for patenting. Each instance in which a certificate of authorship is rejected because of lack of innovation in the work must be given proper attention.

As before the question of material-technical support for research is acute. Unfortunately, fundamental changes in equipping the universities with modern equipment have not yet been effected, particularly with regard to facilities for automation of research—which would permit increasing the productivity of scientific labor tenfold, a hundredfold. You see, modern instruments and equipment for processing experimental data, produced by native industry, are hardly ever received by the universities. MinVUZ, USSR, and the Presidium of the USSR Academy of Sciences plan to take a number of joint measures to correct the existing situation. Specifically, it is planned to bring out and select original studies on new models of instruments and equipment, to complete them jointly, and to manufacture them at the enterprises of the NTO /Scientific and Technical Department/ of the USSR Academy of Sciences, for transfer to the academy's NII /Scientific Research Institute/ and to the universities.

But implementing these resolutions is a matter for the future. And the university administrative organs and the rectors at the VUZ's have already been called upon to utilize all of their capabilities and reserves to strengthen their scientific laboratories and experimental facilities at the learning institutions. The scientific and national economic significance of the research and studies conducted by the VUZ's depends to no small degree on successful solution of this problem. Naturally, appropriations for acquiring instruments and equipment, as well as funding for material-technical resources, will be allocated by the planning organs primarily to support the projects envisaged in the plans for the economic and social development of the USSR and in programs for solving the basic scientific-technical problems and for conducting other important research.

Placing scientific projects on a high methodical and experimental level can to a significant degree help to strengthen the creative cooperation among the VUZ's and the academic branches of NII. The VUZ's should take utmost advantage of this cooperation in utilizing the modern scientific instruments, the apparatus and the computer facilities at these NII. It is also expedient for the VUZ's to strive to make wider use of the scientific equipment and other material-technical resources at enterprises and client organizations, for conducting research on contract. The obligation of the client in this respect should be stipulated in the economic agreements.

Finally, large reserves for improving the state of the scientific equipment at the VUZ's can be found by means of making utmost use of the existing instruments and equipment at the VUZ's themselves. It is particularly inappropriate for unique and expensive apparatus and computer equipment to be utilized ineffectively. Close and continuous control must be established over the use of the most valuable instruments and apparatus; when necessary, two-shift and even three-shift operations should be established.

The university is faced with great and responsible tasks in the area of further developing and increasing the effectiveness of scientific research and in increasing their contribution to the solution of the most important problems of scientific-technical progress. Success in the matter of improving the training of specialists for the national economy depends to no small degree on the extent to which these problems are successfully solved.

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ARTICLE CALLS FOR CLOSER COOPERATION BETWEEN VUZY, ACADEMY AND BRANCH SCIENTIFIC INSTITUTES

Kiev POD ZNAMENEM LENINIZMA in Russian No 6, 1980 pp 41-43

[Article by Academician I. Lyashko, Ukrainian SSR Academy of Sciences, and Professor V. Strikha, Doctor of Physical-Mathematical Sciences: "Unifying Efforts"]

[Text] The present stage in the building of communism is characterized by rapid development of the scientific and technological revolution and by its constantly-growing influence on all areas of life. Soviet science is making a weighty contribution toward increasing this country's economic potential, toward erasing the differences between physical and intellectual labor, and is promoting improvement in the welfare and comprehensive development of each and every Soviet citizen. As was noted by CPSU Central Committee General Secretary Comrade L. I. Brezhnev, Chairman of the Presidium of the USSR Supreme Soviet, science today is a life-giving source of technical-economic and social advance for us, of improvement in the spiritual culture of the people and their prosperity.

The scientists of scientific establishments and higher educational institutions are making a worthy contribution toward accomplishment of the tasks assigned by the party. Each year the 70,000-person working team of the Ukrainian Academy of Sciences [Academy of Sciences of the Ukrainian SSR] successfully works on more than 2,000 research topics. This republic's higher educational institutions are playing an increasingly important role in the development of Soviet science. In the first three years of the 10th Five-Year Plan the volume of scientific research at these higher educational institutions has increased by 30 percent and reached a level of 227 million rubles.

The 25th CPSU Congress assigned Soviet science the following task: "To improve the efficiency and quality of scientific research. To ensure further improvement of the forms of link between science and production. To accelerate adoption of scientific advances into the economy." The strategic areas and tasks of further development of science and strengthening of its link with practical activities, specified by the party congress and concretized by Comrade L. I. Brezhnev in his addresses, form the basis of the activities of the Republic Academy of Sciences and of all scientific establishments.

Accomplishment of the assigned tasks demands further broadening and strengthening of comprehensive links between higher educational institutions and scientific establishments--both academic and branch. Innovative collaboration by this republic's higher educational institutions and academy scientific establishments includes an extensive aggregate of combined measures pertaining to scientific, scientific-organizational and training activities. This makes it possible more efficiently to utilize higher educational institution personnel and to concentrate the efforts of specialists on key problems of the economy.

There has occurred a substantial broadening of participation by higher educational institutions in research specified by the scientific research plan in the area of the natural and social sciences. This republic's higher educational institutions, jointly with institutes of the AN UkSSR, are taking part in work on 430 research topics. For example, the Kiev Order of Lenin State University imeni T. G. Shevchenko is involved in productive cooperation with more than 60 academy establishments, and the Kiev Order of Lenin Polytechnic Institute imeni 50th Anniversary of the Great October Socialist Revolution--with 19. The Khar'kov, Odessa, L'vov, Dnepropetrovsk and other state universities as well as many other higher educational institutions in this republic are conducting joint research with academy institutes.

Work results attest to the fruitfulness of such collaboration. For example, scientists at Kiev University and the Ukrainian Academy of Sciences Institute of Physics have designed and built a laser frequency standard with automatic electronic fine adjustment, which has been awarded a VDNKh [Exhibit of the Achievements of the National Economy of the USSR] medal. Scientists at Khar'kov University, the Khar'kov Physics-Technical Institute and the Ukrainian Academy of Sciences Institute of Nuclear Research have conducted a series of research projects dealing with illumination of wave barriers with kinetic effects in an inhomogeneous plasma. The Ukrainian Academy of Sciences Institute of History, together with a number of higher educational institutions in this republic, is working on preparation of a second edition of "Istoriya Ukrainskoy SSR" [History of the Ukrainian SSR], a comprehensive work entitled "Istoriya Kiyeva" [History of Kiev], as well as a textbook entitled "Istoricheskiy atlas USSR" [Historical Atlas of the Ukrainian SSR].

Combined programs and topics occupy an important place in the research activities of higher educational institutions and academy institutes. Focused on the end economic result, they make it possible to concentrate manpower and resources on key research areas. The Ukrainian Academy of Sciences Council on Study of Productive Resources of the Ukrainian SSR coordinates research on problems of development and distribution of the productive resources of the Ukrainian SSR, conducted by academy institutes jointly with higher educational institutions--Kiev, Khar'kov, Donetsk, L'vov and Uzhgorod state universities, Kiev Polytechnic Institute, Ternopol' Finance-Economic Institute, and others. The Ukrainian Academy of Sciences Institute of

Economics and Donetsk State University are working on six combined scientific research topics, including work on development of a set of models and programs for automated management systems for the city of Donetsk.

The institutes of the Ukrainian Academy of Sciences Department of Literature, Language and Art Criticism and Kiev, Khar'kov, Odessa, Donetsk and Dnepropetrovsk state universities are working on a number of combined topics, on the following problems: "Theory of Socialist Realism and Problems of the Forming of Art and Literature of the Communist Society," and "Contemporary Foreign Theories of Literature and Art and a Critical Analysis of These Theories." Fifteen higher educational institutions in this republic, jointly with the Ukrainian Academy of Sciences Institute of Electric Welding, are working on an Ukrainian Academy of Sciences combined scientific-technical program to develop new welding processes and technologies.

Higher educational institutions of the Ukrainian SSR Ministry of Higher Educational Institutions and scientific establishments of the Ukrainian Academy of Sciences Department of Physics are working on a total of nine combined programs, the departments of chemistry and chemical technology--three programs, etc. Promising research is also being conducted by scientists of the republic's Academy of Sciences on performance of combined, specific-purpose automatic control system programs for development and adoption of new tools and materials, new types of electrical equipment, and are studying the interaction of turbulent plasma with a magnetic field, radiation disturbances of thin films, and other important scientific and technical problems.

Joint research on combined topics has made it possible to produce important scientific results, adoption of which in the nation's economy is producing significant economic effects. For example, adoption of research results on the combined program "Quality of Cathode-Ray Tubes," conducted by institutes of the Ukrainian Academy of Sciences Department of Mathematics, Mechanics and Cybernetics and a number of higher educational institutions in this republic, produced savings of 7 million rubles.

Conduct of joint scientific research projects enables higher educational institution personnel to utilize the scientific equipment (unique custom-made equipment in many cases) of the institutes of the Ukrainian SSR Academy of Sciences. For example, a unique installation for simulating conditions in space at the Ukrainian Academy of Sciences Physical-Technical Institute of Low Temperatures is being utilized by scientists from Khar'kov State University to investigate surface mass transfer under conditions of space. Improvement in the level of scientific research conducted by this republic's higher educational institutions will be promoted by expanded utilization of the instrumentation and equipment of the academy institutes and establishment of branch interministerial laboratories.

In recent years there has been an increase in the volume of commercial-contract research conducted by this republic's higher educational institutions on contract with academy institutes. In 1976-1978 Kiev State

University conducted more than 60 such research projects, totaling more than 4 million rubles, and Kiev Polytechnic Institute--4.5 million rubles.

This republic's scientific establishments and higher educational institutions are constantly working on improving methods of liaison with production and are conducting a search for new, optimal forms of their participation in scientific and technological advance. Higher educational institutions and academy institutes are conducting more and more commercial-contract research for industrial enterprises. Such a uniting of efforts improves the quality of research performed, shortens research project time, and ensures effective incorporation of their results into production. In 1976-1978 adoption of the results of joint scientific research conducted by Kiev State University and Academy institutes produced savings totaling 1.81 million rubles; by Kiev Polytechnic Institute and academy institutes--almost 4 million rubles. Scientists at Khar'kov State University and the Ukrainian Academy of Sciences Institute of Geotechnical Mechanics have developed a device for preventing oscillations of mine hoist balance cables, which has been patented in the USSR, Belgium, Canada, and a number of other countries. Savings from adoption of this device just in the mines of the Krivoy Rog Basin should exceed 47 million rubles.

However, the number of commercial-contract research projects conducted by higher educational institutions and academy institutes on contract with industrial enterprises is increasing rather slowly up to the present time. More assistance should be given to higher educational institutions in speeding up practical adoption of the results of scientific research.

The effectiveness of scientific research conducted by scientists of the Ukrainian Academy of Sciences and this republic's higher educational institutions is attested by the considerable number of joint monographs, scientific articles and papers at international, all-union and republic scientific conferences. Further increase in the number of published collective monographs would be promoted to a substantial degree by broadening of the publishing base. It would evidently be advisable for the Naukova Dumka and Vyshcha Shkola publishing houses to schedule a specific volume of joint publications by scientists of this republic's higher educational institutions and Ukrainian Academy of Sciences institutes.

The Ukrainian Academy of Sciences lends considerable assistance to higher educational institutions in training highly-qualified personnel for the economy and culture. The CPSU Central Committee and USSR Council of Ministers decree entitled "On Further Development of Higher Schools and Improving Quality of Training Specialists" noted the importance of direct participation by scientific personnel, and particularly leading scientists, in the academic process at higher educational institutions. At higher educational institutions in the Ukrainian SSR, students attend lectures given by almost 180 scientists from the republic academy, including 66 academicians and 85 corresponding members of the Ukrainian Academy of Sciences.

It is important not only that students receive information on the latest scientific problems first-hand, as they say. Personal participation by leading scientists in the teaching process and in the Science Days held at higher educational institutions has a positive influence on drawing students into scientific work.

Ukrainian Academy of Sciences personnel take active part in putting together and reviewing curricula, which makes it possible and continuously to improve the teaching process, and they assist higher educational institutions in preparing textbooks and manuals. For example, scientists at the Ukrainian Academy of Sciences Institute of Economics and they Kiev Institute of the National Economy prepared two political economy methods manuals. A number of textbooks and manuals have been published by Kiev, Uzhgorod, Khar'kov and other state universities and academy institutes.

Each year as many as 5,000 students from this republic's higher educational institutions receive practical experience at establishments of the AN UkSSR. A total of 68 Ukrainian Academy of Sciences institutes and establishments are assigned to higher educational institutions as base facilities. Students working on term and senior projects at Ukrainian Academy of Sciences institutes are greatly benefitted by participation in the proceedings of scientific seminars of the divisions and laboratories.

Involvement of students in working on important current scientific problems and their participation in the work of scientific teams under the supervision of scientists is of great importance for boosting the level of training and preparation of specialists, development of skills in scientific work, and arouses their interest in scientific research.

Scientific competitions held by the Ukrainian Academy of Sciences play an important role in providing incentive for scientific research by students as well as young teachers and scientific staff at higher educational institutions.

Deepening of productive cooperation is fostered by periods of assignment of higher educational institution instructors at Ukrainian Academy of Sciences institutes (involving almost 200 persons in 1979), and mutual assistance by higher educational institutions of the Ukrainian SSR Ministry of Higher Educational Institutions and scientific establishments of the Ukrainian Academy of Sciences in training scientists--candidates and doctors of sciences. Candidates of sciences are trained in particular with narrow-specialization graduate study. Its scale, however, is unfortunately still insufficient. An increasing number of higher educational institution doctoral candidates serve a training stint at scientific establishments of the Ukrainian Academy of Sciences prior to defending their dissertation.

Participation by 960 representatives of higher educational institutions on 33 scientific councils of the republic Academy of Sciences, which coordinate more than 70 scientific research plans, which include more than 3,500 research topics, is an important area of strengthening scientific ties between establishments of the Ukrainian Academy of Sciences and higher educational institutions. More and more frequently higher educational institutions and scientific establishments, under the supervision of problem scientific councils of the Ukrainian Academy of Sciences, participate jointly in organizing and holding conferences--all-union and republic, as well as regional and city scientific seminars. Kiev State University, for example, organized and held more than 50 all-union and republic conferences, seminars and schools in the current five-year plan jointly with various institutes of the Ukrainian Academy of Sciences.

Collaboration between scientists of educational institutions of the Ukrainian SSR Ministry of Higher Educational Institutions and scientific establishments of the Ukrainian Academy of Sciences is organized on the basis of productive cooperation agreements. At the present time more than 300 such agreements are in force in this republic, including 62 at Kiev State University, 35 at Kiev Polytechnic Institute, 34 at Khar'kov State University, etc. Unfortunately the majority of these contractual agreements include only cooperation in performance of a specific scientific task, without specifying other aspects of productive cooperation, particularly in the area of curricular activities. In our opinion, in the future preference should be given to contractual agreements which include comprehensive cooperation between higher educational institutions and Ukrainian Academy of Sciences institutes.

Academic-scientific (UNO) and Academic-Scientific-Production (UNPO) associations are the highest form of organization of productive cooperation. They provide a direct link between science and production and concentrate the efforts of the scientists of the institutes of the Ministry of Higher Educational Institutions and Ukrainian Academy of Sciences, scientists and specialists working in production, for rapid solution of current-importance problems of the economy and improvement of training of young specialists, bringing the academic process as close as possible to production tasks.

Work experience indicates that UNO and UNPO are capable of playing an important role in the successful conduct of joint scientific research in the most important areas of science, and particularly in shortening research time and time required to incorporate the results of basic research into the economy. For example, within the framework of two UNPO--Spetsmaterialy and Polimery--the Institute of Physical-Organic Chemistry and Coal Chemistry of the Ukrainian Academy of Sciences, Donetsk State University, the Rubezhanskiy affiliate of the Voroshilovgrad Machine Building Institute, and a number of production associations and branch institutes worked on adoption of structurally colored noncombustible resins and hardeners, which made it possible to obtain savings of 1.6 million rubles just at one enterprise. The UNO and UNPO have already amassed certain experience in training highly-qualified specialists.

Development of a comprehensive system of controlling the quality of training of specialists by the Council of Vice-Chancellors of the L'vov Higher Educational Institution Center jointly with scientists of the Ukrainian Academy of Sciences Western Scientific Center is quite interesting. This system consists essentially in determining standard requirements on the quality of principal types of college-level work, the introduction of work quality control and evaluation indicators, adoption of an information and management system employing computers, and extensive utilization of moral and material incentive. More than 50 scientifically substantiated recommendations have been drawn up, which encompass all structural subdivisions of the educational institution, all members of the staff, and which precisely define the scope of their duties, ways to achieve excellent work results, and work evaluation criteria.

We must state, however, that synthesis and dissemination of amassed experience and know-how in joint work is being accomplished very slowly to date.

Analysis of the participation of this republic's higher educational institutions and academy establishments in the conduct of scientific research, incorporation of research results in the economy, and in training specialists attests to the successful development and high degree of effectiveness of such productive cooperation. At the same time considerable reserve potential and opportunities remain to be utilized in this area.

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REPORT ON GENERAL MEETING OF AZERBAIJAN ACADEMY OF SCIENCES

Baku BAKINSKIY RABOCHIY in Russian 22 Mar 80 p 2

[Unattributed Azerinform article: "To New Heights of Science: Annual General Meeting of Azerbaijan Academy of Sciences"]

[Text] The spectrum of research conducted by Azerbaijan scientists is broad and diversified, running from investigation of the deep structure of the earth to utilization of satellite hardware for the benefit of the economy, from penetration into the secrets of the human brain to basic research in traditional petrochemical science. This research is being conducted in an extremely deep exploratory well being drilled in this republic, in space, under the waters of the Caspian Sea, in the establishments of the Academy of Sciences, branch scientific research institutes, and in the laboratories and departments of higher educational institutions. The efforts of the scientists of Azerbaijan are focused on accelerating the pace of scientific and technical advance -- a decisive condition for improving the efficiency of societal production and improving product quality. A goal of this research is accomplishment of the task assigned by the 25th CPSU Congress to Soviet scientific personnel -- to join organically the achievements of the scientific and technological revolution with the advantages of the socialist economic system.

The annual general meeting of the Academy of Sciences of the Azerbaijan SSR, held on 18-20 March, constituted a unique report on the status of preparedness of this republic's scientists to carry out the party's responsible tasks in an honorable manner, and their contribution to development of the basic and applied sciences.

Addressing the gathering, USSR Academy of Sciences Corresponding Member G. B. Abdullayev, President of the Academy of Sciences of the Azerbaijan SSR, commented that scientists, together with all the toilers of this republic, experienced a feeling of pride and joyous emotion by award of the Order of Lenin to the Azerbaijan SSR and by Comrade L. I. Brezhnev's message of greeting on the occasion of a great labor victory -- early completion of the targets of the 10th Five-Year Plan pertaining to industrial and agricultural output.

the members of Azerbaijan's scientific community rightly feel that they share in the outstanding successes of the heroic workers of plants and factories, fields and farms, that the inspired labor of scientists is a component part of these successes. This is also indicated by the fact that included among the most important achievements of Soviet science during this past year are 33 scientific projects of scientists of Azerbaijan. The role of the Academy of Sciences of the Azerbaijan SSR in development of the basic and applied sciences in this country and its influence on elaboration and incorporation of a number of major scientific problems received a positive appraisal at a meeting of the Presidium of the USSR Academy of Sciences.

Reporting on significant research and development performed by establishments of the academy this past year, the president noted that particular attention was devoted to expanding those basic and applied research projects which are the most important for the economy of our nation and this republic. Coordination of scientific research underwent further development, specific application of research results has become more effective, and training of highly-qualified scientific cadres has expanded. There was a continuation of joint combined research projects with many of this country's scientific centers, industrial and agricultural organizations, and with foreign scientists.

In conformity with the current demands of scientific and technological advance, substantial efforts were concentrated on organization and expansion of a network of scientific-production complexes, which make it possible sharply to shorten the path from scientific idea to practical application of that idea. The positive experience of the institutes of petrochemical processes and physics, the Kaspiy and Geofizika scientific centers, as well as other establishments of the Academy of Sciences with experimental plants, production facilities, and special design offices attests to the benefit of such associations, which increase many times over the effectiveness of scientist labor.

Important projects are being performed by personnel at the Institute of Space Research of Natural Resources, which have placed space in the service of this nation's economy. The staff of this young scientific establishment is designing unique ground instrumentation and satellite-borne equipment, expanding the area of utilization of space information. Various branches of industry, medicine, and biology need instruments for which the Institute of Physics has developed materials which possess a high degree of resistance to vibration. A device built at the Institute of Cybernetics makes it possible more closely and efficiently to monitor the condition of resuscitation patients. Many of this country's enterprises are incorporating industrial processes for the manufacture of highly-efficient catalysts as well as fuel and lubricant additives. The Oil and Gas Production Administration imeni N. Narimanov has put into operation a commercial installation for treatment of formation water, an installation which not only recycles this water and increases formation yield but also substantially reduces corrosion of oil-well equipment. Geologists have designated new and promising oil and gas exploration areas. Research in the area of molecular biology and molecular genetics is deepening and expanding. In 1979 this republic's scientists produced more than 300 important research results in the area of the natural and social sciences.

The speaker emphasized that this republic's scientists are today faced with even more responsible tasks. All attention should be concentrated in those areas which can produce appreciable economic effect in the immediate future. The Academy of Sciences, as a coordinating center, should step up its leadership role in solving scientific and technical problems which are of great significance for Azerbaijan's socioeconomic and cultural development. The efforts of scientists in the 11th Five-Year Plan will be concentrated on elaboration of major scientific and scientific-technical problems pertaining to further development of the fuel-energy complex, the search for new and efficient utilization of previously-discovered natural resources, a boost in the technical level of production in ferrous and nonferrous metallurgy, accelerated growth and development of petrochemicals, development and production of new, high-quality products and materials. Of continuing importance is research in the area of electronics and computer hardware, development of more efficient automation equipment, improvement in the technical level of the agrarian-industrial complex, environmental protection, and intensification of agricultural production.

On behalf of those present, G. B. Abdullayev voiced assurances that scientists will honor and celebrate with inspired productive labor the 110th anniversary of V. I. Lenin's birth and the 60th anniversary of Soviet Azerbaijan and the Republic Communist Party.

A report on scientific and scientific-organizational activity by the Academy of Sciences in the preceding year was presented by Azerbaijan SSR Academy of Sciences Academician T. N. Shakhtakhtinskiy, a member of the Presidium. He reported that the work of the academy presidium, which coordinates all scientific activity in the republic, was directed toward elimination of deficiencies, which were pointed out in an acute and highly-principled manner by the Central Committee of the Communist Party of Azerbaijan. A number of measures were taken to unify the productive efforts of scientists and specialists on the basis of a unified scientific research plan and more efficient distribution of research topics among scientific establishments. This made it possible to bring the research problem coverage area closer to the specific needs of the nation's economy, more closely to monitor and control the development of science, and to reduce the number of little-effective research topics and projects. In the course of radical reorganization of science in this republic, special attention was focused on problems of adopting research results in industry and agriculture. Last year 56 research project results were adopted, the overall savings from which totals in excess of 60 million rubles, which is almost double the plan-specified target.

The structure of scientific establishments is being improved, in order to bring it into greater conformity with the thrust of research in progress and basic research areas. Ten laboratories have been established, as well as new divisions and a new sector, a seismology field party attached to the Geofizika scientific center, and the Malaya Khimiya scientific center has been established.

Invention and patent-licensing activities have improved. More than 300 research project results have been designated inventions -- this is a greater number than at any time in the past. Ten patents have been granted as a result of research and development performed at the Institute of Petrochemical Processes, and a license has been sold to Italy for a process for producing ethylene oxide developed by staff members of this institute. A number of inventions have been included in the academy's new equipment adoption plan, as well as in the republic economic and social development plan.

The speaker emphasized that at the same time shortcomings continue to occur in the activities of the Academy of Sciences. Not a single discovery credited to Azerbaijan scientists has yet been registered. Instances of parallelism and duplication of research, as well as research projects of little value have not yet been eliminated. The number of doctoral dissertation research projects performed in the course of a year's time has declined by almost half. More effective research should be conducted in the area of rational, efficient utilization of Azerbaijan's natural resources, and particularly the Apsheron Peninsula, the Nakhichevan ASSR, other regions, plus exploration for and development of fuel reserves, and conservation of land and water resources. It is expected that scientists will resolve the comprehensive problems of the Caspian and will present suggestions and proposals on combating corrosion of metal equipment in the offshore oilfields.

In spite of the fact that in 1979 the Elm Publishing House published a number of current-importance monographs possessing theoretical and applied value, substantial errors of omission are still occurring in the publishing activities of the Academy of Sciences. Certain work has been performed on implementation of the Azerbaijan Communist Party Central Committee decree on measures pertaining to study, publication and dissemination of the literary legacy of the great Azerbaijani poet and thinker Nizami Gyandzhevi. The third volume of the Russian-Azerbaijani Dictionary has come out, completing publication of this important work. Social scientists, however, are still far from acquitting their debt to this republic's toilers and are slow in rectifying the errors to which the Central Committee of the Communist Party of Azerbaijan has pointed time and again.

Those attending the meetings discussed the tasks of the Academy of Sciences of the Azerbaijan SSR in the area of resolving current problems pertaining to development of this republic's economy. Participants in the ensuing discussion and debate included Azerbaijan Academy of Sciences

Academician A. P. [illegible], corresponding members of the USSR Academy of Sciences; republic Academy of Sciences Academicians V. S. Aliyev, I. I. Ibragimov, M. Dzh. Dzhafarov, Sh. F. Mekhtiyev, F. K. Kocharli, and G. A. Aliyev; Azerbaijan SSR Academy of Sciences Corresponding Member A. A. Abdullayev. The speakers noted that it is a matter of professional honor for scientists to turn out scientific product which is exclusively of excellent quality. They emphasized that Azerbaijan scientists will apply all their productive energies, knowledge and know-how in order to ensure that the efficiency of their labor becomes even greater, that research results not remain within the confines of the laboratories but directly benefit the economy, promoting the spiritual enrichment of society. It was stated at the meeting that unfortunately many scientific teams and individual scientists have not yet corrected serious deficiencies, forgetting that the research work they perform should be in full conformity with the demands of life and technological advance, and bring benefits to the people.

The meeting approved the report on Academy of Sciences activities in 1979.

At the final session on 20 March, the annual general meeting, considering the important role played by Academician A. P. Aleksandrov in the development of basic science in the area of physics and the extensive application of physics research results in power engineering, in study and utilization of energy sources, which have led to an accelerated pace of socioeconomic development of this country, in the establishment and development of the basic sciences in Azerbaijan, in study and utilization of this republic's natural energy resources, as well as continuous assistance to the Academy of Sciences of the Azerbaijan SSR in development of basic scientific research and training of cadres, with a unanimous vote elected eminent scientist Academician A. P. Aleksandrov, thrice Hero of Socialist Labor, recipient of the Lenin and USSR State Prizes, President of the USSR Academy of Sciences and Chairman of the Council on Coordination of Scientific Activities of the Academies of Sciences of the Union Republics, an honorary member of the Academy of Sciences of the Azerbaijan SSR.

Election of full members (academicians) and corresponding members of the republic Academy of Sciences was held that same day.

The following were elected full members of the Academy of Sciences of the Azerbaijan SSR, with designation of area of specialization: mathematics -- F. G. Maksudov; physics -- M. I. Aliyev; control automation -- I. A. Ibragimov; chemistry -- A. M. Kuliyev; oil and gas field development -- M. T. Abasov; general biology -- Dzh. A. Aliyev and M. A. Ali-zade; medicine -- M. Dzh. Dzhavad-zade; history -- P. A. Azizbekova and Dzh. B. Guliyev.

The following were elected corresponding members of the republic Academy of Sciences, with areas of specialization designated: mathematics -- M. G. Gasymov; physics and technology of semiconductors -- E. Yu. Salayev and M. G. Shakhtakhtinskiy; solid-state theory -- F. M. Gashimzade and

Yu. M. Seyidov; control automation and computers -- T. M. Aliyev and F. G. Guseynov; scientific instrument engineering -- Ch. O. Kadzhar; chemistry -- R. A. Babakhanov and N. M. Guseynov; petrochemical synthesis -- M. M. Guseynov, Yu. G. Kambarov, and K. I. Sadykhov; chemical physics -- B. A. Dadashev and I. G. Kerimov; oil and gas technology -- M. I. Rustamov; geology -- Academician A. Ali-zade; oil and gas field development -- M. K. Seid-Rza; botany -- I. A. Safarov; zoology -- A. G. Kasymov and N. G. Samedov; medicine -- B. A. Agayev; history -- I. G. Aliyev; history of the CPSU -- T. K. Kocharli; literature -- B. M. Vagabzade, A. M. Mirakhmedov and K. A. Talybzade; Azerbaijani language -- Z. A. Budagova; economics -- A. A. Nadirov and Z. A. Samed-zade; philosophy -- A. M. Aslanov; Oriental studies -- B. M. Guseynov; fine arts -- F. M. Amirov and K. D. Kerimov.

Participants in the meeting included K. M. Bagirov, Secretary of the Central Committee of the Communist Party of Azerbaijan, S. P. Tatliyev, First Deputy Chairman of the Council of Ministers of the Azerbaijan SSR, and K. A. Guseynov, Deputy Chairman of the Council of Ministers of the Azerbaijan SSR.
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UKRAINIAN ACADEMY OF SCIENCES GENERAL MEETING ASSESSES WORK OF SCIENTIFIC INSTITUTIONS

Kiev PRAVDA UKRAINY in Russian 21 Mar 80 pp 1, 3

[Unattributed article (RATAU): "Increasing Contribution of Scientists Toward Acceleration of Scientific and Technological Progress"]

[Text] At the present stage of building communism, when the Soviet people are carrying out on a grandiose scale a program of economic and social development, the role of science, which in fact has become a direct productive force, is growing particularly rapidly. "In accomplishing the important tasks which face our nation's economy, especially at the threshold of the next five-year plan," stressed Comrade L. I. Brezhnev, "the party is counting on effective assistance by our scientists -- of the USSR Academy of Sciences, the republic and branch academies, and all scientific research institutes." Seeking to increase their contribution toward implementation of the tasks advanced by the 25th CPSU Congress, a detachment of scientists which numbers into the many thousands is broadening the front of basic and applied research and is speeding up practical adoption of the results of scientific projects.

The results of the activities of the Ukrainian Academy of Sciences in the fourth year of the five-year plan and tasks for 1980 were discussed at a session of the General Meeting of the Academy of Sciences of the Ukrainian SSR, held in Kiev on 20 March.

Prominent scientists, top administrators of scientific research institutes and higher educational institutions, and representatives of party, Soviet, and public organizations gathered in the auditorium of the Kiev City Executive Committee.

The meeting presidium included A. A. Titarenko, member of the Politburo and secretary of the Central Committee of the Communist Party of the Ukraine; A. S. Kapto, Politburo candidate member and secretary of the Central Committee of the Communist Party of the Ukraine; V. A. Masol, Deputy Chairman of the Ukrainian SSR Council of Ministers and Chairman of Ukrainian SSR Gosplan; N. F. Nikolayev, Deputy Chairman of the Ukrainian

SSR Council of Ministers; Academician B. Ye. Paton, President of the Ukrainian SSR Academy of Sciences; Yu. N. Yel'chenko, First Secretary of the Kiev City Party Committee; Ya. I. Azhipa, official from the CPSU Central Committee Science and Educational Institutions Division; F. M. Rudich, head of the Science and Educational Institutions Division of the Central Committee of the Communist Party of the Ukraine; S. I. Gurenko, secretary of the Donetskaya Oblast Party Committee; V. A. Zgurskiy, Chairman of the Kiev City Executive Committee; members of the presidium of the Ukrainian SSR Academy of Sciences, and officials from a number of republic ministries and agencies.

Ukrainian SSR Academy of Sciences President Academician B. Ye. Paton, addressing the meeting, emphasized that the academy's scientists had worked hard and persistently in the year under review to implement the resolutions of the 25th CPSU Congress and the instructions of CPSU Central Committee General Secretary Comrade L. I. Brezhnev, Chairman of the Presidium of the USSR Supreme Soviet.

In his address he analyzed in detail the results of AN UkSSR [Ukrainian SSR Academy of Sciences] activities in 1979. He noted that research teams have achieved significant success in many fields of knowledge — mathematics, physics, materials science, chemistry, biochemistry, biology, and others. Social scientists have achieved significant results. The results of more than 600 scientific research projects have been incorporated into our nation's economy, producing savings of approximately 370 million rubles. This republic's research scientists have received more than 2000 certificates of invention, while 37 scientists have been named winners of USSR and Ukrainian SSR State Prizes in the area of science and technology. The institutes of cybernetics and problems of materials science have been awarded challenge Red Banners of the CPSU Central Committee, USSR Council of Ministers, All-Union Central Trade Union Council and Komsomol Central Committee for successful accomplishment of plans and socialist pledges. Scientific research facilities have improved, and there has been improvement in staffing them with highly-qualified cadres. There has been an increase in participation by this republic's researchers in execution of major national economic and international scientific programs jointly with scientists of the USSR Academy of Sciences and republic academies.

Objects of special concern for this republic's scientists included problems the importance of solving which was emphasized at a session of the academy's general meeting last year by First Secretary of the Central Committee of the Communist Party of the Ukraine Comrade V. V. Shcherbitskiy, member of the Politburo of the CPSU Central Committee. These include first and foremost development of the fuel-energy complex, improvement of the quality of materials and development of highly-efficient technologies of obtaining and processing them, improvement of computer software, and raising of the scientific and technological level of agriculture.

Analyzing [illegible] achievements [illegible] accomplishments, the president of the [illegible] primary significance [illegible] of the economy and discussed the growing [illegible] centers as typical examples [illegible] efforts of scientists and production [illegible] economic tasks.

Speakers at the session [illegible] V. V. [illegible], [illegible] and [illegible] members of the Ukrainian SSR Academy of Sciences [illegible] Smirnov, [illegible] Ivanov, and [illegible] G. I. [illegible]; Ukrainian Minister [illegible] and [illegible] Minister of Health [illegible]. They noted that the Soviet people have entered the final year of the 10th Five-Year Plan, a year of vigorous preparations for the party's 26th Congress. Occupying the attention focus of all work forces are the practical tasks outlined in the addresses by CPSU Central Committee General Secretary Comrade L. I. Brezhnev, Chairman of the Presidium of the USSR Supreme Soviet, at the November (1979) CPSU Central Committee Plenum and to his constituents in Moscow's Baumanskiy Electoral District. Right now, on the eve of the 110th anniversary of Vladimir Il'ich Lenin's birth, [illegible] meetings are being held throughout the country with the following slogan: "Live, work and struggle in the Leninist way, communist fashion!" This [illegible] fully in conformity with the character of [illegible] scientists and the goals of today's general meeting of the Ukrainian SSR Academy of Sciences.

During the years which have passed since the 25th CPSU Congress, scientists have made a significant contribution to the growth of the national economy. The results of their research [illegible] knowledge of nature and society, have fostered [illegible] of complex social processes, and have become the basis for development of advanced technology, new machinery and mechanisms, instruments and equipment, high-yield agricultural crops, and [illegible] diseases. Initiation of [illegible] constituted a practical [illegible].

In the current five-year plan the CPSU Central Committee [illegible] recommended for broad dissemination the [illegible] experience of the Ukrainian SSR Academy of Sciences [illegible] efficiency of scientific research and [illegible] research results, and [illegible] of basic research. [illegible] of basic and applied research [illegible].

The speakers [illegible] development of the Ukrainian [illegible] unified economic complex. It was emphasized that the interests of the national economy demand concentration of resources and manpower in the main areas of its development and technical retooling. The importance of coordination of the work of scientific and production teams and a purposeful, planned approach to organization of research and practical incorporation of research results is increasing in connection with this. Experience has already been acquired with this approach in this republic, in the academy in particular. And therefore at the present time, when the targets of the next five-year plan are being formulated, it is necessary to do everything to achieve, on the basis of this approach, substantial acceleration of adoption of scientific advances into production. Scientific-technical programs of republic-wide significance should play an important role in development of the economy. Scientists from various fields of knowledge should take active part in elaboration of these programs.

Continuing the discussion of tasks facing researchers, the speakers drew particular attention to the necessity of developing totally new technologies and industrial process systems, ensuring improved efficiency of the economy and product quality as well as a substantial increase in labor productivity which, as Vladimir Il'ich Lenin stressed, is in the final analysis a determining condition for the victory of communism. The fuel-energy complex should become an important point of application of the efforts of this republic's scientists. There is a strong need to elaborate and implement an extensive intersectorial program aimed at achieving economy of consumption of energy resources, a campaign against losses of coal and fuel, and the development and adoption of new, promising sources of energy. It was pointed out in particular that it is very important to obtain a thoroughly-developed theory which would permit us to view from a different perspective the conventional industrial processes in the coal industry, to define new approaches to development of mining equipment, and which in this manner would make it possible to improve the planning of the production processes under increasingly more complex conditions of coal extraction. The metallurgical industry, machine building, environmental protection, comprehensive and efficient utilization of natural resources require considerable attention.

[illegible] of this academy, [illegible] with adoption of the CPSU Central Committee [illegible] Ministers' decree on improving planning and the economic mechanism, [illegible] well substantiated recommendations aimed at [illegible] scientific approach to the present stage of planning [illegible] more strongly [illegible] place on [illegible] scientific and [illegible] and [illegible] legal settlement [illegible] and [illegible]

[illegible]

ESTONIAN AS GENERAL MEETING HELD IN TALLIN

Tallin SOVETSKAYA ESTONIYA in Russian 27 Mar 80 p 3

[Text] On 26 March, the 34th annual meeting of the Estonian SSR Academy of Sciences was held in Tallin. The results of the scientific activity of republic scientists and the tasks of increasing their contribution to the accelerated progress of Soviet science and in so doing, progress of the entire national economy of our country, were discussed in a businesslike, exacting atmosphere.

The year 1979 was marked by new achievements in actualizing the resolutions of the 25th CPSU Congress, the resolutions of CPSU Central Committee Plenums and the instructions contained in speeches by Comrade L. I. Brezhnev, CPSU Central Committee General Secretary and USSR Supreme Soviet Presidium Chairman, for the collective of the republic Academy of Sciences, as it was for the entire Soviet people, K. Rebane, President of the Estonian SSR Academy of Sciences, said in the opening remarks. The research and experiment plans and the socialist obligations assumed were carried out successfully.

The Estonian SSR Academy of Sciences, jointly with the academies of other republics and the USSR Academy of Sciences, has participated this past year in carrying out very important scientific and technical programs and has continued developing and implementing programs of priority importance to the republic, K. Rebane noted. Such programs included: "Comprehensive Use of Oil Shale," "Comprehensive Use of Phosphorites," "Use, Restoration and Protection of Natural Resources" and "Forecasting and Planning Economic and Social Development of the Estonian SSR." The Estonian SSR Academy of Sciences Presidium worked out a plan of measures to improve scientific research in academy institutes, to develop design and experimental work, to expand the material base necessary for this, and to improve the working and living conditions of scientists.

K. Rebane reported that the initial results of actualization of this plan have been achieved. In February 1980, the academy's Institute of Chemical and Biological Physics began operating. In order to increase the effectiveness [illegible] of biologically active compounds synthesis and their [illegible] experimental organic synthesis and biological [illegible] organized at the Institute of Chemistry.

[illegible] republic [illegible] have [illegible] of Sciences of the Institute of [illegible].

The CPSU Central Committee [illegible] the obligation [illegible] of introducing the achievements of science [illegible] practice more widely [illegible] scientists of Soviet [illegible] important directions [illegible] energy.

Academician [illegible] 1971 and the scientific research [illegible].

The [illegible] by the task of increasing [illegible] attention to [illegible] in carrying out [illegible] the institutes [illegible] comp. The fact that [illegible] and 27 institutions [illegible] testifies to the [illegible] portant problems of modern science. Among the most important [illegible] sults noted [illegible] the Estonian SSR Academy [illegible].

[illegible] spoke at the [illegible] institutes. The Institute of [illegible] studies, on improving [illegible] the Institute of Chemical and Biological Physics obtained important results in studying [illegible] credited with important achievements in [illegible] climate. Work in the field of power engineering [illegible] which was done at the Institute of [illegible] important practical significance. [illegible] important contribution to the development of agriculture, raising [illegible] productivity, by developing new means of combatting agricultural pests [illegible] pesticides and pheromones [illegible]. The condition of [illegible] was determined [illegible] research by scientists at the Institute of Zoology and Botany [illegible] out for restoring and protecting them. Geological [illegible] and evaluation of republic minerals and water [illegible]. The Institute of Zoology and Botany [illegible] species of plants and [illegible] requiring special protection in the republic.

[illegible] that were significant for all of progressive humanity. In the celebration of the 110th anniversary of the birth of V. I. Lenin, the work being done by institutes of the social sciences division is especially significant. It includes studying the history of the revolutionary movement of the Estonian working class, work on reference works devoted to a sociological review of Soviet Estonia and to pressing problems of Soviet society. In carrying out the CPSU Central Committee decree on further improving the economic mechanism and the tasks of party and state agencies, economists play an active role.

In 1979, the plan for contract scientific research was exceeded nearly twofold, providing the national economy with an impact in the millions of rubles.

This year, the academy collective will work on 97 pressing problems and 206 projects.

The fulfillment of these plan assignments, said A. Keyerna in conclusion, will demand of all links of the Academy of Sciences intensification of scientific research. He expressed his confidence that, in celebrating along with the entire community the anniversary dates in the life of the country and republic, scientists will carry out with honor the responsible tasks entrusted to them and will make a worthy contribution to the continued progress of Soviet science.

Taking part in the meeting were L. [illegible], department head in the Estonian Communist Party Central Committee, and I. Rust, Estonian SSR Minister of Higher and Secondary Special Education.

The annual meeting of the Estonian SSR Academy of Sciences was timed to coincide with an exhibit of the latest models of scientific equipment developed by Estonian scientists in 1979 which was on display in the academy's presidium building.

CSO: [illegible]

LITHUANIAN ACADEMY OF SCIENCES [illegible] ACTIVITIES

Vilnius SOVETSKAYA LITVA in Russian [illegible]

[Article: "Strengthening the Link Between Science and Practice"]

[Text] The number of fundamental and scientific-technical projects that were worked on by the Lithuanian Academy of Sciences and its coordination organizations increased nearly 1.5-fold last year. The number of jobs executed by economic contracts and contracts for creative cooperation increased similarly for the year. This was reported [illegible] session of the general meeting of the Lithuanian SSR Academy of Sciences.

Attending the session were [illegible] L. Sherpetis, Deputy Chairman of the Lithuanian SSR Council of Ministers; [illegible], Chief of the Department of Science and Institutions of Learning of the Central Committee of the Lithuanian Communist Party [illegible], and other responsible workers.

The President of the Academy of Sciences, [illegible], was the first speaker. Reports were given by the chief scientific secretary [illegible], academician-secretaries of sections [illegible]. The speakers and the discussion participants noted that, [illegible], Lithuanian scientists have achieved [illegible] advances in their work.

The Academy of Sciences is participating in [illegible] 68 comprehensive programs, including 23 programs on an all-union level. Along with traditional ways there is an ever growing emphasis on new ways. The new ways include the program on man and the biosphere, which is being carried out by many organizations, [illegible] of scientific research, and others. [illegible] part of the Lithuanian scientists have won recognition in the USSR and abroad-

Academician V. Statulyavichyus was awarded the USSR State Prize for a cycle of work in mathematics.

Ninety-four percent of the inventions that were recognized last year have either been adopted or are being adopted into practice. Works that were used in 1979 in the national economy provided an economic savings for the year of 15 million rubles. The growing creative friendship between the collectives of scientists and production workers is helping to speed up the scientific processes and to strengthen the ties between the researchers and practice. Thus, the chemists and industrial specialists have jointly created laboratories and a model shop for the adoption of scientific innovations at enterprises of the radio-electronic, instrument building and electromechanical industries. The Institute of the Physics of Semiconductors, which along with workers of the electronics industry has opened an interdepartmental laboratory for semiconductor integrated circuits, has pursued this same path.

Specialists in social sciences have solved some important problems. They have continued to study questions concerning the raising of efficiency, improving management and forecasting public production, as well as the interaction of a developed socialist society and the individual in conditions of the present day scientific-technical revolution and other pressing problems.

Session participatnts examined tasks for the further raising of the efficiency of scientific research for implementing the decisions of the July and November plenums of the CPSU Central Committee and the December Plenum of the Central Committee of the Lithuanian Communist Party. Academicians A. Burachas, I. Hutskus and Corresponding Member of the Academy A. Yasaytis gave speeches on these matters.

The session approved amplifications and addendums to the articles of the charter of the Lithuanian Academy of Sciences.

5227
CSO: 1801

MOLDAVIAN AS GENERAL MEETING HELD IN KISHINEV

Kishinev SOVETSKAYA MOLDAVIYA in Russian [illegible]

[Text] Multiplying the potential of the scientific base for further developing the national economy of the republic and accelerating the rates of scientific and technical progress were the basic questions discussed at a session of the annual General Meeting of the Moldavian SSR Academy of Sciences which convened on 27 March in Kishinev.

Work on increasing the effectiveness and quality of scientific research, on strengthening its ties to production, on accelerating the introduction of scientific achievements into practice and perfecting planning were among the most important directions of academy activity this past year. More than half the 130 projects were done on assignment from republic and USSR State Committee for Science and Technology directive agencies. Upwards of 100 developments by scientists were transmitted for introduction into the national economy. The economic impact of the work has increased as compared to the preceding year, to over 27 million rubles. Scientific ties with industrial and agricultural enterprises of the republic on the basis of scientific and technical cooperation agreements were broadened considerably. Research on 19 pressing problems was done jointly with scientific-production associations of the Moldavian SSR Ministry of Agriculture.

These and other results of Moldavian SSR Academy of Sciences scientific and scientific-organizational activity in the fourth year of the five-year plan were presented in a report by Corresponding Member [illegible], chief scientific secretary of the academy presidium. He noted the great significance to the development of science and the national economy of work being done by scientists on major, fundamental problems in the social sciences, mathematics, semiconductor physics and chemistry, crystallography, creating the theoretical foundations of dimensional electrochemical metalworking, methods of optimizing and managing energy systems, quantum chemistry, the genetic foundations of selection, and many other problems of biology and agriculture in light of the resolutions of the July (1978) and November (1979) CPSU Central Committee Plenums.

Our party views combining the achievements of the scientific and technical revolution with the advantages of socialism as a task of historic importance.

noted USSR Academy of Sciences Corresponding Member A. A. Zhuchenko, President of the Moldavian SSR Academy of Sciences. His report was devoted to the tasks of the republic Academy of Sciences in concluding the 10th Five-Year Plan and conducting scientific research in the 11th. During the past four years, he said, the work by scientists and the entire academy collective was aimed at carrying out the resolutions of the 25th CPSU Congress and the 14th Congress of the Moldavian Communist Party. Party and government decrees on improving scientific research planning and accelerating the introduction of results into production, strengthening ties between fundamental and applied research, played an important role in increasing the effectiveness of the republic's scientific potential. In so doing, a system of coordinating scientific research and experimental design at all organizational levels was determined and conditions were created for strengthening the experimental-production base and for changing over to the problem-goal principle of research planning.

The coordinating role of the headquarters of Moldavian science has increased considerably. The speaker stressed the great importance of the newly created Republic Council to Coordinate Interbranch Scientific and Technical Problems. This has enabled us to begin the practical implementation of the most complex republic tasks in the area of protecting natural resources and using them intelligently and increasing the role of intensive factors in developing the national economy of Moldavia, and especially its agro-industrial complex. During the five-year plan thus far, work has been done in the republic Academy of Sciences to improve the structure of academy institutions, research planning, increasing its fundamental and regional importance, and concentrating scientific effort on solving the most important national economic tasks.

Actualization of the comprehensive programs approved by the republic Academy of Sciences presidium and the collegia of individual ministries and departments has facilitated accelerating the practical use of scientific achievements. In cooperation with scientific-production associations of the Moldavian SSR Ministry of Agriculture, scientists of the division of biological and chemical sciences have obtained substantial results on a number of problems in the area of increasing the yields and quality of grains and vegetables and intensifying feed production. Quite a bit has been done to help the national economy of the republic under a comprehensive program in which all the academy institutes have participated. During the first four years of the five-year plan, [illegible] scientific projects were completed, twice as many as during the same period in the preceding five-year period. Their economic impact was [illegible] million rubles. At the same time, the report noted, the influence the Academy of Sciences has on the rates of scientific and technical progress in the main branches of the national economy is still inadequate. The number and level of recommendations for introduction do not correspond to the tasks and opportunities of the scientific institutions. Often, partial problems are solved, a majority of which are within the competence of the branch institutes.

[illegible] party and [illegible] financed [illegible] [illegible] three [illegible] [illegible] developing [illegible] [illegible] planning and [illegible] will ensure [illegible] [illegible] industrial [illegible] of the republic.

An important [illegible] will [illegible] to developing [illegible] principles of an [illegible] system [illegible] [illegible] solved in order [illegible] the [illegible] cultural production [illegible] conditions [illegible] intelligent use of [illegible]

Having [illegible] be reinforced by a [illegible] [illegible] and the [illegible]

[illegible] experts [illegible] [illegible]

[illegible] participants [illegible] Sciences [illegible] People, a [illegible] National [illegible] Academy [illegible] of Differential [illegible] [illegible] chronicler.

Participating in the [illegible] Committee [illegible] deputy chairman [illegible] chairman [illegible]

[illegible]

[illegible]

KAZAKH AS GENERAL MEETING CHANGES STATUTE, ELECTS NEW PRESIDIUM

Alma Ata KAZAKHSTANSKAYA PRAVDA in Russian 5 Apr 80 p 3

[Text] All the work of the Kazakh SSR Academy of Sciences general meeting session was permeated with a profound striving to do more to further develop Soviet science and increase its role in building communism, in all branches of the economy and culture, in increasing the well-being of the workers.

In opening the session with introductory remarks, Kazakh SSR Academy of Sciences president and USSR Academy of Sciences corresponding member A. M. Kunayev noted that republic scientists did a certain amount of work in the fourth year of the five-year plan to carry out the resolutions of the 25th Party Congress, the 14th Kazakh Communist Party Congress, subsequent CPSU Central Committee Plenums, and party and government decrees. Quite a bit was done to improve current and long-range planning of republic scientific development and to concentrate effort and means in its leading directions.

Republic academy scientists have rendered great service to Kazakhstan achievements this past year. A majority of the modern branches of science are widely represented in its institutes and other subdivisions. A number of the fundamental research projects they have conducted in the fields of physics, mathematics, astrophysics, geology, seismology, mining, chemistry, metallurgy, biology, physiology and the social sciences have won recognition both here and abroad.

The economic effectiveness of the research is being improved. As compared with 1976, it increased more than three-fold and as compared with 1978 -- by 75 percent. In 1979, some 130 works by republic Academy of Sciences scientists were introduced into production. A majority of them belong to the divisions of chemical-technological sciences and earth sciences. The Institute of Metallurgy and Enrichment completed years of theoretical research studying the properties of nonferrous and rare metal sulfide and oxide vapors and of intensifying their condensation. The Institute of Chemical Sciences obtained data of interest in the guided synthesis of polyphosphate fertilizers, and there are many such examples.

Republic Academy of Sciences ties with production were substantially reinforced in the reporting year. Plans were approved for joint work in the [illegible] The USSR Academy of Sciences Presidium has noted the initiative of the Kazakh Academy of Sciences [illegible] research and [illegible] in 1979 [illegible] with [illegible] [illegible] return.

The session noted that this stage of scientific development is characterized by a new form of labor organization among scientists [illegible] all of their [illegible] and applied research [illegible] working [illegible].

One of the most important tasks of the national economy is the comprehensive use of mineral raw materials and water resources. This problem is especially critical in Kazakhstan, in which connection the formation and development of comprehensive programs for our republic are of great importance. The presidium, divisions and institutes of the Academy are making considerable efforts along these lines.

Together with representatives of the natural and technical sciences, scientists of the social sciences must pay the most serious attention to drawing up comprehensive plans. Under conditions of developed socialism, the role of social scientists increases particularly so as to facilitate the successful solution of economic, ideological and social problems.

It is the goal of scientific research to obtain new facts and experimental data. The number of certificates of invention and applications for inventions submitted by Academy scientific institutions is increasing year by year. In 1979, more than [illegible] certificates of invention and positive decisions to issue them were received. During the reporting period, 11 patents and 17 decisions to issue patents were obtained. Talks were held with representatives of a number of foreign companies on concluding licensing agreements. The most serious attention must be paid in all Academy of Sciences divisions to innovative research, to carrying it out at the invention level.

In the accounting year, [illegible] inventions developed in Kazakh Academy of Sciences institutions found application in the national economy, involving an economic impact of more than [illegible] million rubles. Inventions provided more than half the total economic impact of introducing completed scientific research.

A number of important results were obtained in the social sciences. Work was completed on a five-volume "History of the Kazakh SSR" in Russian. The first volume of the "History of Kazakhstan" in Kazakh was recommended for production. The results of many years of work by Kazakh SSR Academy of Sciences member A. Kh. [illegible] on the Begazy-Dandybayev culture of Central Kazakhstan were published. The Institute of Philosophy and Law successfully completed research on "The Local Soviets and Enterprises of Higher Subordination."

Work devoted to poetic language, literary criticism, problems of bilingualism in modern Kazakh literature and others was continued. The Institute of Economics issued proposals on reducing the capital-intensiveness of producing industrial output.

In light of the CPSU Central Committee Decree "On Further Improving Ideological, Political-Education Work" and Comrade L. I. Brezhnev's works "Small Land," "Rebirth" and "Virgin Land," scientists have intensified the development of pressing problems of Marxist-Leninist theory, questions of ideological work, and are actively helping party organizations in the communist education of the workers.

A Council on Scientific and Technical Progress in Agriculture and Industry was created in the Kazakh SSR Council of Ministers to improve coordination of scientific research and concentrate effort on solving the most important problems of developing the republic national economy. An interdepartmental scientific and technical council uniting ministry and department specialists under the republic Academy of Sciences was simultaneously organized.

In this connection, scientists are faced with a number of specific tasks. As scientific potential develops, the role of informational and organizational work intensifies. The use of modern methods of storing, processing and transmitting information is therefore an absolute condition for close ties between science and production. We need to change-over more quickly to automated scientific control systems, introducing an automated monitoring system in the first stage. This will substantially increase the flexibility with which the implementation of joint research plans and comprehensive programs is guided and the flexibility with which the work of the scientific councils is coordinated.

Socioeconomic development of the republic requires the creation of goal-oriented academy branches or divisions in each large region. We plan to open branches of a number of academy institutes soon in Karaganda and, on their basis, to create a new scientific center. A second such center is to be organized in Shevchenko. We also anticipate organizing other institutes in accordance with the new directions of science.

Much attention was paid at the session to question of improving everyday organizational work in the scientific research institutions, to improving the training and education of young scientists, checking execution, strengthening discipline, and increasing initiative and responsibility for the work entrusted to scientists.

Kazakh SSR Academy of Sciences corresponding member N. K. Nadirov, chief scientific secretary of the academy presidium, reported at the session on the activity of the Kazakh SSR Academy of Sciences in 1979. A report by Kazakh SSR Academy of Sciences member Ye. V. Gvozdev, Vice-President of the Kazakh SSR Academy of Sciences, on the tasks of academy scientists in light of the resolutions of the November (1979) CPSU Central Committee Plenum.

Participating in discussing the reports were Kazakh SSR Academy of Sciences member S. K. Kenesbayev, Kazakh SSR Academy of Sciences corresponding member and Director of the Astrophysics Institute T. B. Omarov, Kazakh SSR Academy of Sciences member G. N. Shcherba, Kazakh SSR Academy of Sciences member and academic secretary of the chemical-technological sciences division B. A. Zhubanov, Kazakh SSR Academy of Sciences member and Director of the Institute of Hydrogeology and Hydrophysics, Hero of Socialist Labor U. M. Akhmedsafin, Kazakh SSR Academy of Sciences member and Director of the Institute of Experimental Biology F. M. Mukhamedgaliyev, and Kazakh SSR Academy of Sciences corresponding member and Director of the Institute of Economics T. A. Ashimbayev.

The resolution adopted by the session of the Kazakh SSR Academy of Sciences general meeting orients the activity of scientists towards further concentrating efforts and means on the primary directions, on further increasing the contribution science makes to accelerating scientific and technical progress and improving work quality in all branches of the economy. In preparing for a worthy greeting to the 110th anniversary of the birth of V. I. Lenin, the 26th CPSU Congress and the 60th anniversary of the Kazakh SSR and the Communist Party of Kazakhstan, the collectives of republic academy institutions will participate with even greater creative activeness in research and in introducing scientific research results into industry, agriculture and other branches.

Diplomas were handed out at the session to winners of the 1979 Ch. Ch. Valikhanov Prize and to winners of Kazakh SSR Academy of Sciences prizes for the best student works.

Several changes were made in the Charter of the Kazakh SSR Academy of Sciences. The session examined organizational questions. A new Kazakh SSR Academy of Sciences Presidium was elected. USSR Academy of Sciences corresponding member A. M. Kunayev was elected President of the Kazakh SSR Academy of Sciences again. Ye. V. Gvozdev, Sh. Sh. Ibragimov and B. A. Tulepbayev were elected vice-presidents of the Kazakh SSR Academy of Sciences. Kazakh SSR Academy of Sciences corresponding member N. K. Nadirov was elected chief scientific secretary of the academy presidium.

Division academician-secretaries O. A. Zhautykov, Zh. S. Yerzhanov, B. A. Zhubanov, T. B. Darkanbayev and Z. A. Akhmetov, Kazakh SSR Academy of Sciences members S. K. Kenesbayev, N. A. Dobrotin, A. N. Nusupbekov, D. V. Sokol'skiy and A. A. Abdullin, and Kazakh SSR Academy of Sciences corresponding member Sh. G. Bolgozhin were elected Kazakh SSR Academy of Sciences presidium members.

Participating in the work of the Kazakh SSR Academy of Sciences general meeting session were Kazakhstan Communist Party Central Committee second secretary O. S. Miroshkhin, Kazakhstan Communist Party Central Committee secretaries Z. K. Kamalidenov and N. A. Nazarbayev, Kazakh SSR Council of Ministers first deputy chairman V. A. Grebenyuk, Alma-Ata obkom first secretary K. M. Aukhadiyev and leaders of a number of republic ministries and departments.

11052
CSO: 1861

SCIENTISTS MEET IN BAKU TO DISCUSS PROBLEMS OF BIOSPHERE, STUDYING NATURAL RESOURCES FROM SPACE

Baku BAKINSKIY RABOCHIY in Russian 25 Mar 80 p 3

[Article (Azerinform): "Space and Environmental Protection"]

[Text] Spacecraft, cruising distant regions far above the Earth, are at the same time acquiring more and more terrestrial "occupations." And the further development and improvement of orbital hardware is accompanied by increasing capabilities for its utilization for performing major scientific and economic tasks. Geography, cartology, biology, hydrogeology and many other sciences are in a firm link with space. Scientists working on problems of environmental protection are today being presented with considerable opportunities.

Problems of employing space hardware in solving the problem of protecting and improving the natural environment are the subject of discussion at a joint session of the bureau of the USSR Academy of Sciences Scientific Council on Problems of the Biosphere and the bureau of the USSR Academy of Sciences Commission on Study of Natural Resources With the Aid of Space Hardware, which opened in Baku on 24 March.

The meeting was opened with an introductory address by Academician A. V. Sidorenko, Vice-President of the USSR Academy of Sciences. He warmly congratulated the workers of Azerbaijan on their great labor victory -- early completion of the targets of the 10th Five-Year Plan pertaining to industrial and agricultural output, on the coveted award they have received -- the Order of Lenin, and the message of congratulations delivered by Comrade L. I. Brezhnev. The outstanding success achieved by the workers of decorated Azerbaijan is a result of hard, intense labor by workers, kolkhoz farmers, intelligentsia, and all the fine toilers of this republic. He stressed that a considerable contribution to this success has also been made by the scientists of Azerbaijan, for without thorough scientific substantiation and specific-goal scientific programs, economic success is impossible.

Having congratulated the members of the republic Academy of Sciences on the occasion of its 35th anniversary, A. V. Sidorenko noted the significant achievements of Azerbaijan's scientists both in branches which are traditional for this republic -- petrochemistry, geology, and in new, successfully developing scientific areas -- physics and utilization of information obtained with space hardware for the benefit of the nation's and republic's economy. He stated that a fine school has been established here in the area of study and utilization of natural resources and current resolution of the problems of environmental protection. In particular, this explains the fact that this meeting is being held in Baku, where effective research in the area of protection of the biosphere is being successfully combined with the already considerable wealth of experience in deciphering information obtained from orbital space vehicles and methods of applying this information in the economy. In addition, the territory of Azerbaijan is a unique region where within a comparatively small area there is a large body of water -- a sea, mountains, forests, broad steppes and semideserts, which makes it possible to conduct studies of this kind particularly effectively.

The audience was greeted by USSR Academy of Science Corresponding Member G. B. Abdullayev, President of the Academy of Sciences of the Azerbaijan SSR, by Azerbaijan Academy of Sciences Academician G. A. Aliyev, Chairman of the Republic Nature Conservation Society, and Doctor of Technical Sciences T. K. Ismaylov, Director of the Institute of Space Investigation of Natural Resources of the Azerbaijan SSR Academy of Sciences.

Candidate of Physical-Mathematical Sciences A. A. Gorchiyev presented a paper entitled "Study of Air Pollution in Large Industrial Cities of Azerbaijan on the Basis of Combined Investigations." Academician Yu. N. Fadeyev of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin discussed the prospects of current collection of information on the plant-health state of crops with the aid or aerospace methods. An address by USSR Pilot-Cosmonaut Hero of the Soviet Union V. V. Kovalenok dealt with the innovative initiative of the crew of a manned spacecraft in studying Earth resources.

The following papers were also presented: "Climate on the Basis of Observations from Space" -- by Corresponding Member of the USSR Academy of Sciences K. Ya. Kondrat'yev; "Problems of Protection of the Biosphere in Azerbaijan" -- by Academician of the Azerbaijan SSR Academy of Sciences G. A. Aliyev; "Some Problems of a Space System of Monitoring Anthropogenic Pollution" -- by Candidate of Technical Sciences Yu. V. Novikov; "Utilization of Aerospace Data for Public Health Evaluation and Forecasting" -- Academician of the USSR Academy of Medical Sciences V. P. Kaznacheyev; "Utilization of Space Information for Study and Protection of Snow Cover and Glaciers" -- Corresponding Member of the USSR Academy of Sciences V. M. Kotlyakov; "Topographic-Ecological Interpretation of Taiga Areas on the Basis of Aerospace Photography" -- Doctor of Agricultural Sciences D. M. Kireyev; "A Method of Organization and Conduct of Multiple-Factor

Experiments in Studying the Natural Environment of Space" -- Candidate of Physical-Mathematical Sciences P. M. Guseynov.

The meeting is continuing.
[30-3024]

3024
CSO: 1861

SCIENTISTS MEETING IN BAKU RECEIVED IN AZERBAIJAN CENTRAL COMMITTEE

Baku BAKINSKIY RABOCHIY in Russian 26 Mar 80 p 1

[Article: "Reception at the Central Committee of the Azerbaijan Communist Party"]

[Text] On 25 March G. A. Aliyev, first secretary of the Central Committee of the Azerbaijan Communist Party and candidate for membership into the Politburo of the CPSU Central Committee, received the participants of a joint session taking place in Baku between the USSR Academy of Sciences' Office of Scientific Counsel on Problems of the Biosphere and the Office of the USSR Academy of Sciences' Commission for the Investigation of Natural Resources With the Aid of Space Vehicles.

In the name of the participants of the session, the vice-president of the USSR Academy of Sciences, Academician A. V. Sidorenko, expressed his gratitude to the Central Committee of the Azerbaijan Communist Party for its great help in organizing and conducting the scientific meeting. He conveyed the congratulations of his colleagues on the republic's great triumph of labor--the fulfilment ahead of schedule of the tasks of the 10th Five-Year Plan concerning the production of goods for industry and the economy. This work has been awarded the Order of Lenin and has earned a salute from Comrade L. I. Brezhnev. While reporting on the progress of the work of the session in Baku, A. V. Sidorenko noted with satisfaction the fruitfulness and effectiveness of the papers and reports and the exchange of opinions among leading Soviet scientists working in the areas of protection of the biosphere and the utilization of space-borne equipment in the interests of the economy. Plans were made for the immediate tasks in the further development of physical geography through the use of space vehicles. This is being done in order to obtain the maximum use of natural resources. "We are at a new stage in the exploration of natural resources from space," emphasized Academician A. V. Sidorenko. "It is a stage at which the transition to a single complex system is being accomplished. This is a transition to a permanent, specific program for the application of space data with the broadest of aims."

"We ought to mention in particular," said Comrade Sidorenko, "the conclusive and concrete materials presented by the scientific institutions of the Azerbaijan Academy of Sciences--by the Institute of Space Exploration of Natural Resources, the "Geophysics" scientific center and the Institute of Geography." A successful symbiosis has formed in the republic out of three pressing directions in science--research into the protection of the environment, into the utilization of natural resources and into the utilization of orbital equipment in the interests of the economy. In a short period of time considerable success has been achieved by the young collective of the Institute of Space Exploration with its design bureau and test facilities, where unique ground equipment has been created for conducting exploration from satellites. It would be expedient to organize a similar large-scale commercial scientific union for geophysics.

The new directions for research in the areas of natural resource exploration from space, geography and water resources conservation were reported on by Academician I. P. Gerasimov, director of the USSR Academy of Sciences' Institute of Geography, and V. G. Voropayev, director of the Academy of Sciences' Institute of Water Problems and member-correspondent of the USSR Academy of Sciences.

Having thanked his guests for their warm congratulations, G. A. Aliyev noted that the republic is approaching its 60th anniversary with great achievements in economics, science and culture. Also taking place in Baku, on the eve of the anniversary celebrations, was a meeting of the country's prominent scientists engaged in solving the most important economic problems and deciding the scientific prospects for their development. This meeting was a concrete affirmation of the scientific successes and the scientific progress of Soviet Azerbaijan.

Comrade Aliyev emphasized that the session raises extremely important questions which determine a new direction in science--a direction that concentrates many fields of modern knowledge. This is the synthesis of sciences directed at the most efficient study of our planet, its resources and the best means of conserving them. The main thing is to put into the service of the people everything that nature provides and to protect and augment nature's riches. They are far from inexhaustible. Although this problem had been given little thought just a few years ago, it is now very acute. Scientists have much to do in order to turn the whole complex of studies on the protection of the environment into a real force.

The questions raised at the conference are very urgent for Azerbaijan as well. Our scientists in cooperation with collectives of the country's leading scientific centers must work seriously on an effective solution to the problems of protecting the Caspian Sea from pollution, protecting the soil and conserving our water resources. This is particularly important now, when the republic is faced with crucial tasks in the further intensification of agricultural production and in the deepened development and expansion of viticulture.

"The new scientific directions are indeed developing with cosmic speed," said Comrade Aliyev in conclusion. "They contribute to the accelerated progress of our society. We are certain that the republic's Academy of Science, which in recent years has strengthened considerably the ties with industry, will do everything possible in order to resolve even more successfully the problems of developing the fundamental and applied sciences."

Taking part in the discussion were: Secretary of the Central Committee of the Azerbaijan Communist Party K. M. Bagirov; Academicians of the USSR Academy of Sciences Ye. M. Sergeyev and V. Ye. Sokolov; USSR cosmonaut and Hero of the Soviet Union V. V. Kovalenok; Academician of the All-Union Order of Lenin Academy of Agricultural Sciences imeni V. I. Lenin Yu. N. Fadeyev; Academician of the USSR Academy of Medical Sciences V. P. Kaznacheyev; G. B. Abdullayev, president of the Academy of Sciences of the Azerbaijan SSR and member-correspondent of the USSR Academy of Sciences; member-correspondents of the USSR Academy of Sciences V. V. Bogorodskiy, K. Ya. Kondrat'yev and V. M. Kotlyakov; Deputy Chief of the Cosmonaut Training Center imeni Yu. A. Gagarin Yu. A. Afanas'yev; Academician of the republic's Academy of Sciences and Director of the Institute of Geography of the Academy of Sciences of the Azerbaijan SSR G. A. Aliyev; Deputy Chief of the department of science and institutes of learning of the Central Committee of the Azerbaijan Communist Party B. S. Sardarov; and the Director of the Institute of Space Exploration of Natural Resources of the Azerbaijan SSR Academy of Sciences and Director of Technical Sciences T. K. Ismaylov. (Azerinform)
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SCIENTIFIC COOPERATION AMONG CEMA COUNTRIES DESCRIBED

Kiev PRAVDA UKRAINY in Russian 16 Apr 80 p 3

[Article: "Cooperation Among Scientists Grows Stronger"]

> [Text] With the adoption of a complex program of socialist economic integration, the role of the fraternal nations' combined scientific potential in the solution of important fundamental and applied problems has increased greatly. One of these is the investigation of the structure of the Earth's crust, a problem which is of exceptional significance for the future economic development of the member nations of the Council for Mutual Economic Assistance (CEMA).
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> The editorial board of PRAVDA UKRAINY has asked B. Ya. Savenko, learned secretary of the Joint Geophysical Commission of the Presidium of the Ukrainian SSR Academy of Sciences and candidate of geological and mineralogical sciences, to discuss the tasks and forms of cooperation between Ukrainian geophysicists and their colleagues in the fraternal nations as well as their joint contribution to the international division of scientific labor.

"I would like to begin with one concrete fact. Against a background of a palpable energy and raw-material crisis in the capitalist countries, bourgeois propaganda has intensively disseminated the story of a supposed depletion of energy and raw-material sources in the socialist world, too. However, here are the data published in the press: in the last 15 years approximately 150 oil and gas deposits have been discovered in the member countries of CEMA, including the Soviet Union. The significance of these finds varies, but taken together they create a large fuel reserve. Relatively recently new coal deposits have been discovered in Poland, Czechoslovakia and Hungary.

incidentally, for approximately the same length of time--since 1966--joint operations have been carried out by the Commission on Multilateral Cooperation Among Academies of Sciences of Socialist Countries on the Complex Problem of "Planetary Geophysical Research" (KAPG). The creation of a scientifically based theory for predicting mineral deposits is the ultimate goal of the research. I would mention in passing, however, that this is not the only goal: from knowledge about the Earth mankind may derive and does derive for itself much that is useful in practice.

If one speaks about the importance of the scientific contribution to the prediction of mineral resources, then particularly fruitful are the results of a study by the First KAPG Subcommission, "Dynamics and Internal Structure of the Earth," the chief scientific institution in which is the Institute of Geophysics of the Ukrainian SSR Academy of Sciences (the chairman of this subcommission, who heads the seismic measurement department of this institute, is member-correspondent of the Ukrainian SSR Academy of Sciences V. B. Sollogub [as published]). Representatives of the scientific centers of Bulgaria, Hungary, East Germany, Poland, Romania, the USSR and Czechoslovakia comprise 10 working groups that are cooperating on 20 international scientific themes.

For example, in the "Deep Seismic Exploration" group headed by V. B. Sollogub and Academician of the Ukrainian SSR Academy of Sciences A. V. Chekunov, work is being carried out on four themes which include field, systematic and theoretical research and the complex interpretation of geophysical data. Today the network of continuous international and national deep seismic exploration sections that has been developed exceeds 32,000 linear kilometers. New, important data has been obtained on the structure of the Earth's crust along the Wrotslav-Plotsk-Tsiyekhanov section (in Poland). The main faults bounding the Danish-Polish "fissure" on the south and northeast have been determined. Joint experimental studies (in Poland and the USSR) have been carried out on the long sections in Poland and in the Ukraine. Many other types of research have been carried out as well. The most important scientific results are reflected in the international monograph "The Structure of the Earth's Crust and Mantle in Central and Eastern Europe."

Complex geophysical research is being conducted on the international geological traverses in the USSR (the Ukraine and Moldavia), Bulgaria, Romania and Poland. They cross the major tectonic regions where there are earthquakes at present and where more are possible in the future (Crimea in the USSR, Vrancha in Romania, etc.). Using the results of the research, models of the Earth's crust will be constructed. The physical state of the rock at the earthquake epicenters and other characteristics of seismic zones will be determined. In time this will aid in the prediction of natural disasters and the prevention of their consequences.

The work of specialists in the "Magnetic Terrestrial Exploration" and "Geothermic Studies" groups has received international recognition. The work is summarized in the monograph "Geoelectric and Geothermic Exploration in Eastern and Central Europe and in Central Asia." The recommendations contained in the monograph are being utilized in many countries. Particular attention is being devoted to geothermic mapping, the interpretation of measurements of the Earth's heat flux and their practical application. Here I would like to note the fruitful work of the representatives of the Hungarian Academy of Sciences--Professors A. Adam and L. Shtegen. On the Soviet side, considerable success has been obtained by a scientific worker at the Institute of Geophysics of the Ukrainian Academy of Sciences, Doctor of Geological and Mineralogical Sciences R. I. Kutas. He is coauthor of a heat flux map of Central and Eastern Europe.

A monograph, "The Earth's Core According to Geomagnetic Data," has been prepared using the results of 10 years of joint research on the part of a working group investigating paleomagnetism. It summarizes the experimental data obtained by scientists of countries participating in the KAPG and contains the formulation of the basic laws and the theory of the geomagnetic field. On the basis of the summarized data on the territories of the countries investigated, Candidate of Geological and Mineralogical Sciences N. P. Mikhaylov together with his coauthors drew up a map of the paleomagnetic studies of the vulcanites in the Carpathian region.

In a working group headed by Professor W. Mundt (East Germany), regular observations of the Earth's permanent magnetic field are being conducted. The coordinator of one of these groups, Ukrainian geophysicist Professor Z. A. Krutikhovskaya, and the collective she heads have accomplished much in the study of regional magnetic anomalies. Last year, together with Belorussian and Lithuanian geophysicists, they carried out important work in the KAPG program and drew up a map of the anomalous magnetic field in the western portion of the East European platform.

Our Czechoslovakian colleagues have had good success in the area of "Mathematical Methods of Interpreting Geophysical Data and the Construction of Models of the Earth." A collection of articles on the problems of mathematical geophysics has been published in the USSR. Under the guidance of the Ukrainian professor of geophysics Ye. G. Bulakh, research has been conducted on a number of regions in Europe and Asia. The results have been applied in the formulation of schemes to predict the location of mineral deposits (including oil and gas) as well as zones of ore mineralization.

And now a few words about one other direction in this work--the experimental study of physical properties of a mineral substance at high pressures and temperatures. The research that has been conducted recently--first and foremost at the Institute of Geophysics of the Ukrainian Academy of Sciences by Candidate of Geological and Mineralogical Sciences T. S. Lebedev and at the Central Institute of Earth Physics in East Germany by Professor H. Stiller--makes it possible to seemingly peer into the Earth's interior, to represent the thermodynamic processes in the deep zones and to tie in the laboratory data to the field observations. The most important results of the many years of research done by scientists in this working group are reflected in two monographs published in the USSR and in East Germany.

The international cooperation within the framework of the KAPG has a beneficial effect on the efficiency and quality of geophysical research. Highly qualified scientific collectives participate in this joint work, and on the basis of the mutual exchange of experience the most progressive research methods are developed and utilized. The publication of joint scientific papers (and there are dozens of them each year), international symposiums, conferences and the exchange of specialists contribute to the operational mutual concentration of information and the introduction of these results into practice in the economies of the participating countries.

The success of the cooperation of scientists in socialist countries is evident. The transition to work on problem projects will be a new, more progressive scientific organizational form. It has been proposed that the scientists' efforts be more concentrated on the solution to urgent questions, such as the provision of energy, mineral and water resources, reducing the risk of natural catastrophes and the monitoring and protection of the environment.

Work on the problem projects will make it possible to unite the scientific collectives more efficiently and with greater mobility and to utilize the material and technical facilities and equipment of the base laboratories. The main thing is to solve more quickly and efficiently the actual fundamental and applied problems. One must assume, considering the experience already accumulated and the scientific potential at hand, that the international cooperation among the academies of sciences of the socialist countries is capable of achieving new successes along the path of scientific and technical progress."
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